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Fourth Annual Christmas Meeting

LABORATORY SECTION

Toronto, December 30 and 31, 1935

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## INTRAMUSCULAR USE OF LIVER EXTRACT

The administration of liver or of liver extracts has become a firmly established therapeutic measure which restores the blood picture to normal and improves the general condition of patients suffering from pernicious anaemia.

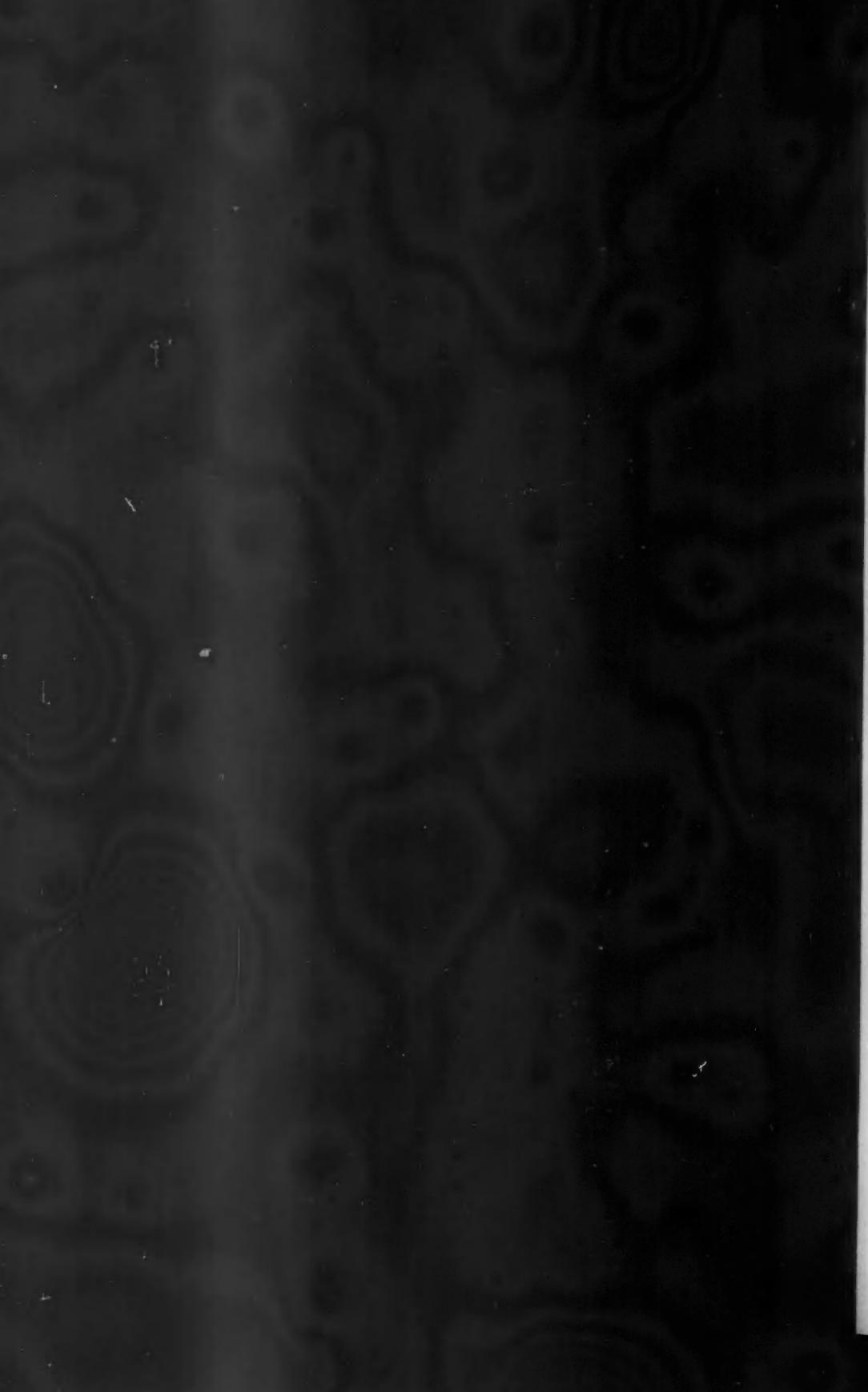
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# CANADIAN PUBLIC HEALTH JOURNAL

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## Cardiovascular-Renal Conditions as a Public Health Problem\*

H. C. CRUIKSHANK, B.A., M.D., D.P.H.

*Medical Director, Manufacturers Life Insurance Company, Toronto*

**T**O determine whether any disease or group of diseases constitutes a problem in public health there must be considered firstly, the mortality, the morbidity and the loss of working efficiency resulting from the condition; secondly, the underlying pathology and the etiology of the condition, whether infective, hereditary, metabolic, traumatic or chemical; and thirdly, the means which can be used to overcome or minimize the effects of the condition or conditions. These problems are considered in this paper from these three angles. Rheumatic heart conditions and the acute nephritides are not included as the subject under consideration includes only the degenerative type of cardiovascular disease. The rheumatic heart is certainly a public health problem but it is a problem of youth and much along public health lines has already been undertaken.

Undoubtedly more people to-day in Canada die of heart disease than ever before. In one respect this is a striking tribute to the public health work already done in this country for men must die and, if life is prolonged to the age at which the degenerative diseases become the chief cause of death, it is evident that deaths from the diseases of infancy and adolescence have been materially reduced and the population protected from them. Deaths beyond the age of 65 or 70 years do not constitute a pressing problem for the public health worker. Desirable as it may be to lengthen the span of life for those who have reached the latter half of middle life, this must be definitely a problem of public health in the future as it concerns problems which arise only with maturity. The problems of the moment are to secure for every infant the opportunity of reaching maturity in a state of physical and mental well-being and to avoid among those reaching maturity the many distressing and disabling conditions which, while not appreciably shortening life, render its prolongation not only painful but often useless and undesirable.

The crude death rates from cardiovascular-renal conditions in Canada have shown a steady increase since the turn of the century. Much has been written as to whether this increase is real or apparent. We know that the

\*Presented before the Section of Vital Statistics and Epidemiology at the Twenty-fourth Annual Meeting of the Canadian Public Health Association, Toronto, June, 1935.

TABLE I  
STANDARDIZED DEATH RATES FROM CERTAIN CAUSES—CANADA (REGISTRATION AREA AS OF 1921), 1921-1932  
(Rates per 100,000 population)

Int. List No. Revision of 1920	Cause of Death	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
74	82a, b	38.2	37.4	34.8	32.1	30.2	31.8	29.2	29.5	27.7	24.9	22.5	22.0
75	82d	10.6	9.0	7.6	7.7	6.9	6.7	6.7	5.8	5.0	4.5	3.6	3.3
89	94c	8.2	6.0	7.6	9.9	10.6	11.2	11.5	13.1	13.0	12.3	10.7	11.2
90	91b, 92;	73.8	82.1	90.0	83.0	85.7	95.0	95.3	96.8	98.5	92.7	83.4	88.4
	93b, c, d;												
91	95	37.0	41.3	44.1	49.9	49.8	50.6	50.7	55.1	55.9	59.9	54.8	59.7
99, 102	94a, 96, 97,	25.9	26.4	31.7	32.9	35.0	36.8	37.0	38.5	37.1	35.7	31.8	34.3
129	131, 132	190.7	202.2	215.8	214.5	218.2	232.1	230.4	238.8	237.2	230.0	206.8	218.9
	Total												

TABLE II  
DEATHS FROM CARDIOVASCULAR-RENAL CONDITIONS BY AGE  
CANADA, 1932

Cause	30-39	40-49	50-59	60-69	70 and over
Cerebral haemorrhage	24	94	248	445	1,225
Angina pectoris	14	76	190	317	423
Other diseases of the heart	266	474	920	1,603	4,595
Diseases of the arteries	47	173	536	1,186	3,699
Chronic nephritis	127	282	436	658	1,514
478	1,099	2,330	4,209	11,456	

age distribution of our population is shifting, that diagnosis is better, that curative medicine and surgery have done a great deal toward alleviating suffering that formerly came to those in middle life. We are not concerned to-day with establishing or disproving this apparent increase. We are concerned with any statistics which will be of value in postulating a public health problem.

Table I, taken from a special report published by the Dominion Bureau of Statistics, shows the standardized death rates for the years 1921 to 1931 from the cardiovascular-renal diseases. The fact that a death rate of 39.6 per 100,000 in Ontario from diphtheria, scarlet fever, measles and whooping cough combined in 1921 had fallen to 20.5 in 1929 while the cardiovascular-renal rates in Canada have increased from 190.7 to 237.2 suggests immediately a public health problem.

However, the age distribution of the cardiovascular-renal deaths is a matter of importance in this discussion. Table II shows the age distribution of these as reported by the Dominion Bureau of Statistics for 1932.

Analyzing this table it is seen that 478 deaths occurred between the ages of 30 and 39, or 1 in 12 of all deaths at those ages; 1,099 deaths occurred between the ages of 40 and 49, or 1 in 7 of all deaths at those ages; and 2,330 deaths occurred between the ages of 50 and 59, or 1 in 5 of all deaths at those ages. No less than 1,577 Canadians born between 1883 and 1902 died in 1932 from cardiovascular-renal conditions. They had reached 30-50 years of age but they had not lived long enough to give this country the benefit of the wisdom that comes only with maturity. This number exceeded by almost 400 the total number of maternal deaths at all ages in the same year. In the same year 4,907 between the ages of 30 and 59 died, not having reached the age to which most of us look forward to provide a respite from the daily grind.

Table III shows a comparison in these same age groups of the other important causes of death. Deaths in the cardiovascular group exceed those from cancer, tuberculosis and violence in the age period 30 to 59. This excess occurs largely in the decade 50 to 59 but in the age group of 40 to 49 years cardiovascular-renal deaths are greater than deaths from either tuberculosis or violence and are not far behind the total for cancer. Surely this number of deaths of individuals at an age when normally they should be at the height of their powers is a challenge to organized public health.

TABLE III  
DEATHS FROM CERTAIN CAUSES BY AGE  
CANADA, 1932

Cause	Total	30-39	40-49	50-59
Cardiovascular-renal conditions.	4,907	478	1,099	2,330
Cancer (all forms).....	3,952	516	1,264	2,172
Tuberculosis (all forms).....	2,855	1,277	885	693
Violence (all forms).....	2,376	805	834	737

Morbidity figures are far from complete but all studies so far made indicate a large degree of invalidism among people 45 years of age and over.

Cardiovascular conditions would appear to rank next to rheumatism as a cause of chronic illness.

Surveys made in Hagerstown, Maryland, showed that 4 per cent were suffering from circulatory disturbances. Studies in New York State have shown that 4 per cent of a large group of individuals were suffering from cardiac disease and 3 per cent from arteriosclerosis. Practically the only Canadian figures are found in the report of the Montreal survey where among 18,995 people examined 2.5 per cent (1 out of every 250) were found to be unable to work because of cardiovascular disturbances. Morbidity figures, wherever found, seem only to intensify the challenge of the mortality figures.

#### *Pathology and Etiology*

The second postulate of a public health problem has to do with pathology and etiology—the injury done to the body and its cause.

The pathology of the cardiovascular-renal conditions is the pathology of arteriosclerosis. Arteriosclerosis is the great underlying factor and its consequences follow upon the thickening of the arterial walls with a decrease in the size of their lumina. As a result there is interference with the blood supply of the organs concerned. In the heart, involvement of the arteriolar branches leads in time to chronic degenerative myocarditis. In the kidney, sclerosis of the blood vessels leads to serious disturbances of the excretory function. In the brain the same changes pave the way for apoplexy and also give rise to the senile dementias of later life.

The pathology is the pathology of arteriosclerosis but, as yet, of the cause of arteriosclerosis we know all too little. Much evidence is being accumulated to show that infections play a not inconsiderable part in the premature production of these changes. Nutritional disturbances unquestionably play a part but more than likely only serve to accelerate an existing condition rather than initiate it. The metabolic or constitutional factors are undoubtedly important but here again the evidence is very scanty.

Do these factors—*infectious, nutritional, constitutional*—interact in the normal organism to produce sclerosis or do they only act on the organism which by heredity is predisposed to suffer from such attack? The impression has been growing that the heredity factor is of the greatest importance. Allen recently made an intensive study of some 500 hypertensive cases on which he was able to get sufficient data of both parents and siblings. His findings indicated—although far from proved—that hypertension was transmitted as a dominant unit trait. We know much of the pathology and little of the cause of cardiovascular-renal disease.

#### *Meeting the Problem*

What can we do about it? We can utilize the knowledge we have. We can continue to minimize the spread of infections, not only the spectacular outbreaks of certain of the acute communicable diseases but the protean common cold and the low grade infections of the sinuses and of the digestive

tract. We can overcome the hazards of industrial poisonings and dangerous trades. More important still, we can obtain further knowledge of the relative importance of the factors which I have mentioned. These data may be obtained from case records of individuals, both sick and well. One point must not be lost sight of. *We have treated these conditions as diseases of middle life. The evidence points to their origin much earlier in life.* Alvarez and Stanley have made the statement that in a prison population of 6,000 the incidence of hypertension is as high at age 15 as at age 40.

If the records of periodic health examinations are to be of value in furnishing material to solve the problem, such examinations must not be discontinued when the child passes from the supervision of the school medical service to be resumed at age 40 or 45 but health supervision must be continuous through life. The clues to the problem of cardiovascular disease will probably be found in the period of young adult life where at present we are not seeking them.

The statistician and the epidemiologist must be on the alert to gather the information now available, to analyze and interpret it. Further, he must be sufficiently abreast of medical science to follow any leads suggested by his study and to request the general practitioner to gather information along the lines required for further study.

#### SUMMARY

1. Cardiovascular-renal conditions are responsible for almost 12 per cent of all deaths in Canada between ages 30 and 50 and 20 per cent between ages 30 and 60—the period of greatest productivity and economic value of the individual.

While morbidity statistics are meagre, the indications are that from 2 to 4 per cent of the population over 45 are incapacitated from these conditions.

2. The pathology of these conditions is primarily that of arteriosclerosis. Infections, metabolic dysfunction, constitutional factors and heredity probably predominate as the basic causes but definite knowledge of the etiology is lacking.

3. Statistical medicine (vital statistics and epidemiology) has a great role to play both in interpreting existing data and in the directing of the collection of that further material from which the gaps in our present knowledge can be filled.

Inasmuch as these cardiovascular conditions are the cause of serious mortality and morbidity in middle life and the causative factor or factors are as yet unknown, they must be considered a problem of the present and immediate future by the worker in the public health field.

# History and Activities of the National Health Division of the Department of Pensions and National Health

J. J. HEAGERTY, M.D., C.M., D.P.H.

*Chief Executive, Asst.*

THE creation of a Department of Health, Canada, in the year 1919 was a progressive measure which has had a far-reaching effect. From the time of Confederation until the year 1872, public health in relation to Canada, as a whole, was under the guiding hand of the Department of Agriculture. Later the administration was divided among the Departments of Marine and Fisheries, Agriculture, and Inland Revenue. The prevention and treatment of tuberculosis were divided between the Department of Finance and the Commission of Conservation. There was, in addition, a National Council of Health operating under the aegis of the Commission of Conservation, whose privilege it was to advise the Federal and Provincial Governments on matters concerning public health. In view of this division of responsibility it is scarcely to be wondered that the subject of health was inadequately treated by the Dominion Government, and also that the Canadian Medical Association and the Canadian Public Health Association passed resolutions and memorialized the Government in and out of season for the creation of a Department of Health. From year to year petitions were presented to the Government by various public organizations, notably women's societies, for the creation of such a department.

In the year 1919 the Department of Health finally came into existence and certain definite duties and powers were given to it and branches created. The powers are set forth in "An Act Respecting the Department of Health". The branches created were as follows:

Quarantine Service, including Leper Stations,  
Immigration Medical Service,  
Food and Drugs,  
Opium and Narcotic Drug,  
Proprietary or Patent Medicine,  
Marine Hospitals' Service,  
Venereal Disease Control,  
Child Welfare,  
Publicity and Statistics,  
Housing.

Subsequently there were added the Laboratory of Hygiene, and Public Health Engineering.

The following have since been discontinued: Publicity and Statistics, Housing, Child Welfare and Venereal Disease Control.

## QUARANTINE SERVICE

The Quarantine Service is responsible for the prevention of the importation of infectious diseases into the country by shipping. This service, as originally organized, was responsible for the prevention of the entrance of all infectious diseases, major and minor. For this purpose there was established in proximity to the principal ports a quarantine station in charge of a medical quarantine officer whose duty it was to board incoming ships and examine passengers and crews for the presence of infectious diseases. Those found to be suffering from these diseases were removed to the quarantine station and the ship was disinfected before being permitted to proceed on its journey.

Quarantine stations are divided into organized and unorganized. The former are in charge of full-time medical officers. The latter, which include all maritime ports at which there is not an organized station and every inland port on the Canadian frontier, are under the supervision of the local customs officers who are *ex officio* quarantine officers for the purpose of the Quarantine Regulations.

At the time of the inception of the Department of Health there were quarantine stations at Halifax, North Sydney, Louisburg in Nova Scotia; Chatham, Bathurst, Campbellton and Saint John, in New Brunswick; Charlottetown in Prince Edward Island; Grosse Isle in Quebec; and William Head and Prince Rupert in British Columbia.

The total number of vessels inspected during the year 1919 was 1916, and the number of persons examined was 560,123. During the fiscal year 1934-35, 2,581 vessels were inspected and 285,470 persons examined.

Since the Department of Health has taken over quarantine the number of organized quarantine stations has been reduced to four, situated at Saint John, Halifax, Grosse Isle, P.Q., and William Head, B.C., and the entire system of quarantine has been completely reorganized. Prior to the establishment of the Department of Health, all infectious diseases were classified as quarantinable, but since 1926 an international agreement has been entered into whereby quarantine is restricted to cholera, plague, smallpox, typhus and yellow fever. Other contagious diseases are not quarantinable and are taken care of at quarantine stations only where proper facilities do not exist for their treatment at the port where such cases are landed. The International Agreement has brought about a complete metamorphosis of quarantine. In addition, the knowledge of the mode of spread of infectious diseases has enabled us to eliminate antiquated and cumbersome methods of disinfection of personnel and baggage, with the result that there has been less delay occasioned to shipping and a great saving in expenditure effected.

Latterly an agreement has been entered into between Canada and the United States whereby foreign ships that have been cleared in the United States shall be admitted to Canada without undergoing inspection, and vice versa. This has helped very materially to facilitate the movement of shipping between the two countries.

The Quarantine Service administers two leper stations, one at Tracadie

in New Brunswick, and the other at Bentinck Island in British Columbia, for the compulsory detention and medical treatment of all cases of leprosy found in the country.

#### IMMIGRATION MEDICAL SERVICE

Associated with quarantine is the examination and medical care of immigrants. It was felt for many years that the examination of immigrants was carried out in a desultory and ineffective manner, and it was hoped when the Department of Health was established that a policy would be adopted affording adequate means for their inspection. To place the examination on a practical basis, full-time medical officers were appointed at the ports of entry for the examination of immigrants. The examination consisted of what is known as "line inspection"; that is, the immigrant passed before the examining physician, who endeavoured to ascertain if he was suffering from any of the medical conditions under which he might be certified as undesirable. It was manifestly impossible for the examining physician to conduct a thorough medical examination under this system, and complaints were received from the provincial authorities that immigrants suffering from medical conditions found their way into the country. In addition, inasmuch as the final decision regarding the admission of the immigrant into the country was made in Canada, hardship and financial loss were suffered by those immigrants who, having sold their possessions, were returned to their country of origin penniless. Moreover, as the United States and Australia had placed their medical officers in Great Britain and on the Continent for carrying out medical examinations, it was considered advisable for Canada to do likewise. To remedy these conditions, the inspection of immigrants was transferred from Canada to Great Britain, Ireland and the Continent. A staff of twenty-eight doctors was appointed to examine at points of origin or at the seaport of embarkation all intending emigrants to Canada. In addition, an arrangement was entered into with four hundred and eighty roster doctors throughout Great Britain to examine immigrants, and an agreement made with the British Government whereby that government would refund to Canada one-half of the payments made to roster doctors for medical examination of prospective immigrants. By this arrangement it was hoped that the medical examination would prove more effective and that disappointment and hardship, which had so often occurred through the necessity of returning immigrants to their native land, would be avoided.

Since the examination has been carried on prior to embarkation for Canada, a large number of persons suffering from physical defects have been weeded out, and the number of immigrants suffering from medical conditions now finding their way to Canada has been materially reduced.

Provision is made for the care of sick immigrants by the Department at the ports of Halifax, Saint John, Quebec, Montreal, Victoria and Vancouver.

It should be noted that, according to the Immigration Act, medical officers report their findings to the Department of Immigration, which has

the responsibility of determining whether or not the physical or medical conditions revealed are such as to debar the immigrant concerned from coming forward. The final decision, therefore, regarding permission to enter the country rests with the Department of Immigration.

Since the depression the number of medical officers has been cut from twenty-eight to seven. They are stationed respectively at Belfast, Glasgow, London, Liverpool, Hamburg, Antwerp and Paris.

#### FOOD AND DRUGS BRANCH

This branch was created in the year 1884, under the Department of Inland Revenue. In 1915 it was transferred to the Department of Trade and Commerce, and in 1919 to the Department of Health. The original organization included a central laboratory at Ottawa and three sub-laboratories situated at Halifax, Winnipeg and Vancouver. Additional laboratories have since been established at Toronto and Montreal.

The object of the Food and Drugs Branch is to set up standards of quality for all foodstuffs and drugs in Canada. It is one of the largest and most important branches of the Department. The original legislation, planned essentially for the protection of the consumer, was amended in 1927 and 1934, and its usefulness thereby greatly increased. It is not to be regarded as solely punitive in character, but serves as a guide for the industries in the preparation of foods and drugs for the market.

During the first year under the Department of Health the number of samples of food and drugs analyzed was 4,906 and during the fiscal year 1934-35 17,361 samples were analyzed, so that the work has more than quadrupled. The development of chemistry during recent years has enabled the manufacturers, with the assistance of their chemists, to adulterate and sophisticate certain foods and drugs in such a way as to make detection almost impossible. To detect the more modern adulterations it has become necessary to adopt new and intricate methods of analyses. Sophistication through the addition of dyes to foods calls for a high degree of technical skill. Other analyses are likewise highly specialized.

Special importance is now given to the inspection of import shipments to prevent the entrance of adulterated and misbranded products. It must be remembered that through reconditioning, by the use of colouring or preservatives, or other methods of sophistication, foods and drugs which are utterly unfit for use can be placed upon the market. The public should know that all foodstuffs on the market possess a certain food value and that the standard is according to that set up by this Department and maintained as such by inspection and analysis. Standards are fixed for a great number of foodstuffs and these are being improved from time to time as our knowledge increases.

An important change in the system of inspection has been made since the National Health Division of the Department of Pensions and National Health has been administering the Act. Now full-time inspectors are in

charge of twenty-five inspectorial districts, which has helped materially in maintaining a satisfactory system of control. The chemists of the branch make analyses for other departments, notably for the Department of Agriculture, which, in the course of the administration of the Dairy Industries Act, collects large numbers of samples of butter and cheese for analysis. The Department of National Revenue forwards many samples of beer, distilled liquors, wine, narcotic drugs, vinegar and medicine to the laboratories for analysis; and similarly the Royal Canadian Mounted Police send samples of narcotics, liquor and even canned meat.

By the amendment of 1927, the sections of the Act dealing with misbranding were extended to include drugs as well as foods. Before that time no restraint was placed upon the statements made on the label, or by collateral advertising, in the marketing of unregistered remedies, with the result that many fraudulent and dangerous remedies have been removed from the market.

In 1934 the Act was further amended to prohibit the sale of remedies for serious illness such as tuberculosis, cancer, diabetes, goitre, etc., as it was considered that people suffering from these diseases should be under the care of a doctor.

#### OPIUM AND NARCOTIC DRUG BRANCH

This branch was established on the 1st January, 1920. It has, therefore, been in operation fifteen years. During the first year a system was inaugurated for the control of imports, exports, manufacture, sale and distribution of opium, morphine, heroin, and cocaine, through legal channels. The control of the illegal traffic was effected through the co-operation of the Royal Canadian Mounted Police and the Department of National Revenue. During the year 1921-22 federal convictions to the number of 835 were secured, and the total number of federal, Dominion and provincial convictions for that year was 1,864. In the calendar year 1934-35 the number of federal convictions was reduced to 170, and that for combined federal, provincial and municipal to 226. This has been due to the fact that the small peddler and drug addict have been left to the control of the municipal and provincial authorities, whereas this Department has confined its activities to the large trafficker. The number of large traffickers apprehended by this Department is indicated by the larger sentences that are being imposed throughout the country. This is an indication of the difficulty that is encountered by the trafficker in carrying on his business, and the efficiency of the work of this Branch.

During the year 1919 there were imported into Canada 12,333 ounces of cocaine, 30,087 ounces of morphine, and 34,262 pounds of crude opium. In the calendar year 1934 the amount of cocaine imported was 2,120 ounces, of morphine 5,476 ounces, and crude opium 458 pounds.

There has been a very marked improvement in the narcotic drug situation over conditions existing during previous years. This can be attributed to the aggressive policy adopted by the National Health Division of the Department of Pensions and National Health and also to the improvement brought about as a result of the International Agreement reached at Geneva at the

second Opium Conference in the spring of 1925, whereby all chemical manufacturers in Europe are licensed, and the export of all narcotics, such as morphine, heroin, cocaine, etc., restricted under export license. The Chief of this Branch is at present the Canadian representative on the Opium Advisory Committee of the League of Nations and also Chairman of the Sub-Committee on seizures which handles matters pertaining to world illicit traffic in narcotics.

The volume of narcotics being smuggled into the country through the underground channels has been materially reduced as a result of international co-operation and the efforts of the Department. Still some supplies of smoking opium are smuggled into the country, particularly through the ports of Union Bay, Nanaimo, and Victoria, B.C., on the Island of Vancouver, and at the port of Vancouver, B.C. There are also considerable amounts of morphine and cocaine smuggled into Canada through ports on the Pacific coast from the Orient. The bulk of the illicit supply, however, such as morphine, heroin and cocaine, is smuggled into the Dominion through the ports of Saint John, N.B., and Halifax, N.S., in the winter season, and Montreal and Quebec, P.Q., during the summer. Illicit shipments of narcotics also reach the Dominion from time to time through United States and foreign ports, such shipments generally being billed as general merchandise or ordinary articles of commerce, falsely packed and labelled, etc.

#### PROPRIETARY OR PATENT MEDICINE BRANCH

The activities of this Branch cover the registration and licensing of all classes of medicine for the internal and external use of man, with the exception of those designed for the treatment of venereal diseases, or those containing opium or its derivatives, cocaine, alcohol in excess of the quantity necessary as a solvent, or if it contains any drug mentioned in the schedule to the Act. A patent or proprietary medicine may not be represented as a cure, and false and exaggerated claims are not permitted to be made either on the label or in collateral advertising. Potent drugs must be declared, with the dosage on the label.

The activities of the Proprietary or Patent Medicine Branch are directed chiefly towards raising the standard of secret formula medicinal preparations sold in Canada and eliminating exaggeration from labels, wrappers, circulars and other advertisements used in connection therewith.

Shortly after this Branch was taken over by the Department, a special review was made of all registered preparations. As a result of this review, the number on the market has been reduced to one-tenth. Furthermore, a more complete explanation is requested as to the nature of the contents of the preparations, and a fuller explanation of the composition on the labels and wrappers insisted upon.

The inspection service of this Branch has full co-operation from the Customs officials, who render particularly valuable service in reporting breaches of the Act and preventing the importation of illegal medicines.

After carefully studying the various remedies placed upon the market

as patent medicines, it was concluded that the Department was not justified in registering a preparation for certain diseases which should be under skilled medical supervision, such for example as goitre, gallstones, Bright's disease, high blood pressure, pneumonia, tuberculosis, scarlet fever, diphtheria, typhoid fever, tumors, cancer, ruptures, obesity, diabetes, arteriosclerosis, venereal diseases, reducing weight, appendicitis, infantile paralysis, spinal meningitis, erysipelas, epilepsy, etc. Other remedies that may not be registered are radio-active substances for restoring sexual virility, mud packs, specifics and abortifacients.

The uninvited and indiscriminate distribution of samples from door to door, through the mail, or upon a public place or highway, has been prohibited under the Act, due to the fact that, before the Department took over this Branch, a number of deaths had been caused by remedies which contained strychnine or some other potent drug being distributed from door to door and consumed by children.

Of the preparations registered, ointments comprised the largest number. Next in numerical order are tonics, liniments, laxatives, and cough remedies. The end result of incessant checking up of patent medicines means that every patent medicine now on the market is harmless and has at least some medicinal value. The market is no longer flooded with useless and fraudulent remedies. In fact, the manufacturer of patent medicines has been forced to do a legitimate business and can no longer exploit the ills of the people.

There is an Advisory Board consisting of three members, with the Chief Dominion Analyst as Chairman, who have power to prescribe what shall be deemed a sufficient medication of medicines containing alcohol in excess of two and one-half per cent to make them unfit for use as beverages; and also what shall be the maximum single and daily doses to be prescribed in the case of any medicines consisting of or containing any drug ~~not~~ used in or added to the Schedule to the Proprietary or Patent Medicine Act. The decision of the Advisory Board is final.

#### MARINE HOSPITALS' SERVICE

Prior to Confederation the medical treatment and care of sailors was unorganized and was, therefore, somewhat haphazard in nature. We find in the year 1822 that the Provincial Legislature of New Brunswick voted the sum of £500 for the establishment of a marine hospital and pest-house, and the city of Saint John provided land for the erection of the marine hospital. This institution was in existence until the year 1893, when it became a home for incurables.

At the time of the passing of the British North America Act, it was decided that, inasmuch as the Dominion was granted the privilege of collecting taxes, quarantine and the establishment and maintenance of marine hospitals should become a function of the Dominion Government. In 1867, therefore, sick mariners came under the care of the Dominion; and, in order to provide funds, a duty was levied on ships entering Canada, and Part V of the Canada

Shipping Act, which relates to sick and distressed mariners, was passed. If we refer to that section of the Act which deals with duty on ships we find that there shall be levied and collected on every ship arriving in any port in the provinces of Quebec, Nova Scotia, New Brunswick, Prince Edward Island or British Columbia, hereinafter called "the provinces", a duty of two cents for every ton which such ship measures, registered tonnage, but in no case shall the duty payable by any ship be less than two dollars in any year. No collector may grant a clearance to any ship on which such duty or any part thereof is due and unpaid.

Although the above provisions did not originally apply to fishing vessels, at a later date an arrangement was made by which the captain of a fishing vessel had the privilege of paying the duty and enjoying all the benefits of the Act.

The master or person in command of any ship paying such duty may send to any hospital for sick mariners, at any hour of the day, and, in the case of accident or emergency, at any hour of the night, any sick mariner belonging to the ship. Such a sick mariner so sent with a written recommendation from such master or person in command of such ship, endorsed as approved by the Collector of Customs of the port, or other officer appointed for the purpose by the Minister, shall be gratuitously received into such hospital, and receive therein such medical and surgical attendance and such other treatment as the case requires. No sick mariner shall be entitled to the benefits conferred by this section of the Act for a period longer than one year without written authority from the Minister, and no sick mariner shall be entitled to treatment or care hereunder when suffering from permanent insanity.

The funds collected for the treatment of sick mariners are paid into the consolidated revenue of the country, and when Parliament meets, a sum sufficient for ~~the~~ treatment of sick mariners is voted by the Government. This money is turned over to the Department to be used for the treatment and care of sick and distressed mariners.

From the year 1867 until 1908, the dues were two cents per ton. From 1908 to 1921, they were one and one-half cents per ton. It was found necessary in the latter year again to increase the dues to two cents per ton as the expenditure was greater than the revenue. In spite of the increase in the rate, we have again reached a point where the expenditure is greater than the revenue.

Each sailor who is a member of the crew of a ship which has paid dues is entitled to treatment when ill, irrespective of the nature or severity of the illness. Treatment is provided in government hospitals, general hospitals, infectious disease hospitals, sanatoria, nursing homes and private homes if hospital accommodation is not available. The National Health Division of the Department of Pensions and National Health has two marine hospitals for the treatment of sailors—one of which is situated at Sydney, N.S. (now in use only in case of infectious diseases) and the other at Lunenburg, N.S. In addition, sailors are placed in some of the Departmental hospitals, which are set aside for the treatment of soldiers, when conditions permit. Contracts

have been entered into by the Department with various hospitals, which number 58, whereby a sailor is given complete hospitalization for a definite per diem rate. In the case of general hospitals, this is at the rate of \$3.00 per day. Infectious disease hospitals vary from \$3.50 to \$5.00 per day. In sanatoria the rate is \$3.50 per day. In hospitals at which there is not an attending physician, the rate is \$2.50 per day. Outdoor treatment is provided at the rate of \$1.50 per visit.

General hospitals, sanatoria and infectious disease hospitals contract to furnish the sailor with ordinary public ward quarters, hospital bedding, linen and clothing, full medical and surgical care, necessary operations, including use of operating room, anaesthetics, x-ray, dressings, hospital appliances, etc., satisfactory diet and medicines, including sera and vaccines. Hospitals in which there is no medical attendant supply all but the services of the physician. In outlying districts where hospitals are not available, a room is found for the sick sailor, generally at the rate of \$1.00 per day, and board, nursing, medical or surgical treatment provided. It has been found necessary in some districts to appoint physicians on a salary basis, and in some others, on a fee basis. There are 23 physicians on salary and the rest are on a fee basis.

The total number of sick and injured mariners treated during the year 1934-35 was 7,064, and the number of days of hospital treatment was 36,636.

#### VENEREAL DISEASE CONTROL BRANCH

In the year 1919 the Dominion and Provincial Governments entered into an agreement for the control of venereal diseases, whereby the Dominion granted the sum of \$200,000 to the provinces on a per capita basis for a limited period, with the understanding that the provinces would expend an amount equal to that received and would establish clinics for the free treatment of venereal disease; examine and treat all prisoners in penitentiaries; maintain laboratories; make a free examination of smears, blood, etc.; undertake a campaign of education; formulate laws for the control of venereal diseases; and generally undertake the work of venereal disease control. A chief of the Branch of Venereal Disease Control was appointed at Ottawa to co-ordinate and supervise the work of the provinces and to inspect the clinics.

In the year 1925 the Dominion grant was reduced to \$150,000. In the following year it was reduced to \$125,000 and in the year 1927 to \$100,000, at which amount it was maintained until the end of the fiscal year 1931-32, when it was discontinued.

Since the grant has been discontinued the chief of the Branch of Venereal Disease Control is confining his efforts to the collection of statistical data almost exclusively. Latterly his title has been changed to that of Medical Adviser, as most of his time is taken up with medical examinations.

#### CHILD WELFARE BRANCH

This branch has recently been discontinued and the work formerly carried on by it is now being conducted by the Canadian Welfare Council, Parliament at its last session having increased the grant to this organization for this

purpose. The Department maintains contact with the Child Hygiene Council of the Canadian Welfare Council.

#### LABORATORY OF HYGIENE

With the organization of the Medical Research Branch in 1921, preparations were set on foot for the establishment of a bacteriological laboratory connected with the Branch. This laboratory was completed in the second quarter of 1922, but was not sufficiently staffed to begin work until towards November of that year, when work was begun with the help of one technician and a laboratory helper.

The work in view was to be largely along the lines of examinations of foodstuffs, both fresh, canned and otherwise prepared, such as came under the scope of the existing Food and Drugs Act. In addition, the functions of the laboratory were planned to carry out examinations in reference to strength, potency and sterility of such drugs as antitoxins, sera and vaccines, and the activity of disinfectants placed upon the market by various manufacturing firms.

In augmentation of the original plans, in May 1924 there was added the Pharmacological Laboratory, which was planned to take care of all investigations dealing with certain pharmaceutical preparations, looking towards an investigation of their therapeutic activities, dispensed by druggists in accordance with physicians' prescriptions. This involved an enquiry into their composition, strength and potency. A further objective laid down was to be the establishment of Canadian standards for such preparations as digitalis, strophanthus, ergot, pituitary extract (posterior lobe), epinephrin, and ouabain, and, in addition, for the various arsenical preparations known under the inclusive term of salvarsan.

Under such a plan of work, matters of pure research naturally took an entirely secondary position, but work of this nature was not neglected and has been productive of papers dealing with problems connected with the cultivation of typhoid bacillus and the gonococcus, the standardization of media, and investigations (the first reported in Canada) upon the infection of human beings with the disease of cattle known as contagious abortion, which is conveyed to the human subject through the drinking of unpasteurized milk or cream. Papers have also been published dealing with the strength and potency of drugs, such as digitalis and ergot, dangers of unpasteurized milk, and on topics connected with public health; also methods of analysis of certain potent drugs.

With the organization of these laboratories, the staff has been increased so as to handle the growing demands made upon the laboratory. In consequence, sanitary surveys have been made in the Maritime provinces in respect to the oyster industry in Prince Edward Island and New Brunswick, and in Nova Scotia in regard to the clam industry. Many miles of coastal waters in these three provinces were carefully inspected and in several instances laboratory examinations were carried out in the field to determine the sanitary fitness of certain shellfish beds, whereby record was made of areas

from which shellfish could be exported to the United States with sufficient guarantee of their healthfulness.

With the promulgation of the Regulations of the Food and Drugs Act, R.S. 1927, the work of the laboratory has been greatly increased.

The Pharmacological Laboratory of the Laboratory of Hygiene has been devoting its energy to the establishment of standards largely based upon the international standards of the League of Nations, in respect to digitalis, ergot, straphanthus, pituitrin, epinephrin and ouabain. These standards made in the laboratory have been checked against standard material obtained from abroad and in the United States, and have been found to be, in each instance, entirely trustworthy. Samples of these standards have already been distributed to manufacturers of such pharmaceutical preparations, both in Canada and abroad.

Inspection of manufacturing premises, both in Canada and United States, has been made by the laboratory staff, looking towards conditions and methods of manufacture that would be acceptable to the Department under its promulgated regulations. This has involved the expenditure of considerable time and energy in bringing such matters to a successful issue, resulting in the granting of licenses to all manufacturers who met the requirements laid down.

#### PUBLIC HEALTH ENGINEERING BRANCH

By Order-in-Council of June, 1923, approval was given to the regulations concerning water for drinking and culinary purposes on vessels navigating on the Great Lakes and inland waters of Canada. Therefore, the chief function of the Branch is the enforcement of the above-named regulations.

All water taken on board vessels navigating on the Great Lakes and inland waters must come from a source which is certified by the Department, and the Department must of necessity be in a position to state if the water supply recommended is free from contamination. All water tanks, piping, faucets, taps, etc., must be under the direction of a certified officer of engineering and operated without connection to any other water system aboard. A certificate of inspection is provided by the Department.

The above regulations were made in pursuance of subsections (d) and (f) of Section 4 of the Act respecting the Department of Health. These subsections provide for the supervision as regards the public health of railways, boats and all other methods of transportation, and the enforcement of any rules or regulations made by the International Joint Commission pursuant to the treaty relating to boundary waters so far as they relate to public health.

One of the first steps following the creation of this Branch was to enter into collaboration with the United States Public Health Service regarding the pollution of boundary waters and the enforcement of regulations regarding drinking and culinary water supplies for common carriers engaged in international traffic. Data were supplied officials responsible for sanitation on the railways of Canada regarding available water supplies. Inspectors were appointed to inspect the tanks and water containers on board vessels plying through the boundary and inland waters of Canada. Steps have been taken

to prevent the pollution of boundary waters and inland waters. It must be remembered that the transient population of some of the vessels plying on the Great Lakes and inland waters of Canada may in the course of a few months be equivalent to the normal population of a large city; and this floating city may be the focus of infection for dangerous communicable diseases. Before any suspicious symptoms develop this transient population may have scattered sickness to cities and other communities along the waterways of the country. The sanitary experts of the International Joint Commission have demonstrated that the waters of the Great Lakes are subject to serious local pollution in the vicinity of cities, likewise the waters of the St. Lawrence and other rivers. The increasing degree of contamination of our rivers, lakes and coastal waters and the growth in transportation are making the question of safe drinking water one of greater importance and increasing difficulty. It is necessary then that this Department be constantly informed of the quality and purity of the source from which the vessels take their water.

Since this Department has enforced the regulations there has been an immediate and marked diminution in the number of typhoid fever cases occurring and originating on board vessels plying on the lakes and rivers of Canada. The work of the Branch has expanded to include the services of four sanitary engineers who devote their entire time to the work outlined above.

As important as the problem of water supply on vessels is that of passenger trains. This Branch supervises the water supply on trains engaged both in interprovincial and international traffic. In addition, this Branch has co-operated with the Department of the Interior as regards the sanitary arrangements of the National Parks of the country.

The Regulations of the Public Works Health Act are enforced by this Branch. The Public Works Health Act has as its object the preservation of health and the mitigation of disease among persons employed in the construction of public works, such, for example, as railways and canals. It is the duty of the Inspector of the Branch to supervise, from the public health standpoint, the quarters occupied by the employees on public works, to see that such houses, tents, etc., are sufficient and sanitary. Also, he is responsible for seeing that there are ample hospital accommodation and sufficient medical services for the men engaged upon such works.

#### MISCELLANEOUS

The services of the Department have been requested by the Civil Service Commission for the medical examination of employees at the time they are being made permanent. Medical certificates presented by civil servants in the case of illness are referred to the medical examiners of the National Health Division of the Department, who pass upon them and, if necessary, examine the individual for whom the certificate has been provided.

As it is obligatory for all employees of the Government, under the age of sixty years, who request superannuation, to undergo confirmatory medical examination, this Department has been requested to undertake such examination. There has, therefore, developed a medical examination section of

the Department, which takes up the entire time of two medical examiners. These examinations are conducted not only at Ottawa but throughout the whole Dominion.

Latterly a request has been received from the Civil Service Association that all civil servants be given a free periodical medical examination. This matter is under consideration.

#### DOMINION COUNCIL OF HEALTH

Public health in Canada is administered by the Dominion and Provincial Governments through their respective departments. The decentralization of public health control, while advantageous in many respects, had the one great disadvantage of isolation. Each of the provinces worked independently; none knew what the other was doing. There was overlapping, wasted effort, perpetuation of obsolete methods, and progress was indefinitely delayed.

To bring the health officers of the provinces and Dominion together where they could meet on common ground, discuss common problems, correlate their work, co-ordinate their efforts, and remedy the defects of isolation, there was created in the year 1919, by Act of Parliament, a Dominion Council of Health. According to the provisions of the Act, the personnel of the Dominion Council of Health was to consist of the Chief Medical Officer of the Department or Board of Health of each province, the Deputy Minister of the Department of Pensions and National Health, Ottawa, and five other persons appointed by the Governor in Council for a period of three years. Four of these five members appointed to the Council represent, respectively, agriculture, labour, rural women's work, and urban women's organizations. The fifth member is there in the capacity of a scientific adviser to keep the Council informed on public health matters. Twice a year the Dominion Council of Health, as above constituted, meets in Ottawa, where problems common to all are discussed and, when feasible, uniform methods of procedure and standard methods adopted. As an indication of the nature of the subject matter discussed at these meetings the following may be cited: interprovincial relations in regard to patients suffering from tuberculosis and other diseases who may have recently removed from one province to another; standardization of venereal disease treatment; workmen's compensation; maternal and child welfare; hospital standardization; industrial hygiene; medical examination of immigrants; quarantine; vital statistics; pasteurization of milk; purification of water; pollution of streams; sanitation of railway, steamboat, and other conveyances; publicity and public health propaganda; protection of health of Indians and Eskimos; drug addiction; and many other subjects dealing with the conditions of public health throughout the Dominion.

Health problems affecting all of the provinces have been discussed and many anomalous situations, hitherto existing, cleared up. Co-operation in reporting vital statistics has been obtained which has helped considerably in the work of the Vital Statistics Branch of the Bureau of Statistics. Regulations governing quarantine for contagious diseases, which differed in the several provinces, have been standardized, and many other difficulties which interfered with the movement of Dominion-wide public health machinery removed.

# Parasitology and its Relation to Public Health in Canada\*

THOMAS W. M. CAMERON, T.D., M.A., PH.D., D.Sc.

*Research Professor of Parasitology, McGill University  
Director, Institute of Parasitology, Macdonald College, P.Q.*

**P**ARASITOLOGY, as a branch of human medicine, is much more important in the tropics than it is in temperate regions. Nevertheless there are many species of parasites which occur outside of the tropics which are of interest and importance to public health, although it must be admitted that so far as man in Canada is concerned these are minor horrors rather than major catastrophes.

The word "parasite" is used in its generally accepted modern connotation as meaning an animal parasite. While parasitic animals occur in all the phyla of the animal kingdom, those of importance here are protozoa, arthropods, and "helminths".

## PROTOZOA

While at least eight species of protozoa have been recorded from man in the Dominion, only one is of definite public health importance. This is the causal organism of amoebiasis.

Amoebiasis is the invasion of human tissue by the pathogenic *Entamoeba histolytica*. This term is not necessarily synonymous with amoebic dysentery; in fact, dysentery appears to be one of the least common symptoms. These are often so mild as to be overlooked or attributed to other causes, and it is still in dispute as to whether *E. histolytica* is always pathogenic. One school believes that it is; another holds that the parasite can live harmlessly in the intestine as does *E. coli*. The first school considers that the apparently healthy carrier, who may never have shown any clinical evidence of disease, must have some amoebic ulcers in his intestine which could be discovered if a careful enough examination were made.

The condition is generally diagnosed by faecal examination, but this is not absolutely accurate and there have been positive cases discovered by the sigmoidoscope which have had consistently negative stools.

The life cycle of entamoeba is a simple one, consisting of a vegetative disease-causing stage, which lives mainly and normally in the large intestine, and of a resistant cystic form, which occurs in the faeces. This is the infective stage and so far as we know man is the only common host. Human infection accordingly can be traced only to contamination of food and water with human faeces. When numerous serious cases occur in an area, the incubation short, the symptoms severe and the liver frequently involved, infection is almost

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certainly due to a grossly infected water supply. This is not uncommon in armies, but the only important civil outbreak is that which recently occurred in Chicago. When such a water supply is not chlorinated, it may be associated with the enteric fevers or bacillary dysentery; chlorination is useless against *E. histolytica*. When human excrement is used as a fertilizer—as it is under Chinese and Japanese market-garden systems, not only in the Orient—food may be quite extensively contaminated. The commonest method of infection, however, appears to be through the personal contamination of food and drink by so-called food-handlers. This is probably the means by which the infection is kept alive in North America.

When a water-borne sewerage system is not in use, flies may be an important source of infection; in this case outbreaks are generally in late summer and fall. In all cases, however, the initial source of infection must be human faeces; generally faeces from a carrier, i.e., one who is showing no clinical symptoms and has no diarrhoea, but is actively secreting the cysts. It is estimated that from five to ten per cent of inhabitants in temperate regions are infected, although the distribution is far from uniform in North America. However, it means that possibly as many as 13 million persons are infected on the continent.

While amoebiasis is normally a sporadic condition, epidemics occur from time to time from gross faecal contamination of water or food.

This was well seen in the Chicago outbreak of 1933. Nearly 28 per cent of a total of 1,100 employees in the implicated hotels were found to be carriers. An investigation showed that the water-sewerage systems were defective in design and that there was a possibility of contamination of the drinking water. In one of the hotels there had been an extensive flooding of the ice-storage house caused by breakage of the sewers. This outbreak caused at least 932 clinical cases (with 52 deaths), of which a third were in the city itself.

One of the great difficulties in discussing the epidemiology of *Entamoeba histolytica* is the probable existence of strains of different virulence. Protozoologists are divided as to whether such variations exist. This still remains unsolved, but it is curious that not only is the disease more prevalent in the tropics—that may well be associated with defects in hygiene—but that symptoms often disappear if patients are moved to temperate climates. Possibly the question of variations in virulence should be considered rather in terms of varying resistance of the host. The fact remains that clinical amoebiasis is rare in northern climates, occurring only as the result of massive doses (as in Chicago) or when resistance is lowered.

Smaller sources of water may be easily contaminated and cysts may remain alive in them for several days or even weeks. Even large water supplies—as in Chicago—may be contaminated if not constructed with due regard to the principles of sanitary engineering. Ordinary bacteriological methods of sterilizing are useless and the only safe method is boiling. Ordinary filtration beds remove Entamoeba effectively. Proper sewage disposal is essential and the use of unsterilized human excrement as fertilizer should be prohibited; all garden produce from such a garden should be cooked. Where no public

sewerage system exists, particular care must be taken against possible contamination of water.

It is impossible to deal with the carrier problem at present, although in hotels and restaurants such persons may be controlled.

Amoebiasis in North America generally is important because of the number of carriers present, rather than because of the presence of disease. It is only under exceptional circumstances that amoebic dysentery occurs in Canada, but the presence of a large reservoir of carriers is disquieting and makes the problem of a clean water supply important and the question of clean handling of food even more so.

It is unnecessary to discuss here the other seven species of protozoan inhabitants of the human intestine. Many are definitely non-pathogenic and of the others which have been shown to exist in Canada, there is no conclusive evidence that they habitually cause disease. They are important at present to the laboratory worker engaged in faecal diagnosis rather than to the public health official.

The ARTHROPODS of interest in Canada are all ecto-parasites such as lice, fleas and bugs, and are, so far as human health is concerned, relatively unimportant. Some of the ticks, however, especially *Dermacentor andersoni* of western Canada, are at least of potential importance, particularly in connection with that plague-like disease tularaemia, as well as with relapsing fever and Rocky Mountain spotted fever.

Biting flies are of considerable interest and although they convey no specific diseases in Canada, some are so common as to make life almost intolerable. This is especially the case with mosquitoes and black-flies. It is interesting to recall that malaria, once endemic in the southern parts of the Dominion, is now absent. It disappeared spontaneously just as it did from Scotland and other northern European lands, probably through advances in agricultural science.

The remaining important groups are all internal parasites and are considered as a single group, the HELMINTHS—although, zoologically speaking, several phyla of the animal kingdom contribute representatives to our entozoa. The flatworms are, for example, in no way related to the threadworms, beyond the fact that they are both animals. However, it is convenient to discuss them under a single heading as they all have several fundamental differences from the other parasites of man. The most important of these is that no helminth is capable of multiplication within the definitive host. They produce innumerable eggs or larvae, of course, but these cannot reach sexual maturity until they leave the body. In most cases, eggs are passed in the stools; larvae are passed out in various ways, through the bloodstream, the skin or even in the muscle. Moreover, these stages passed out of the body—with two exceptions—are not immediately infective to man. A period of extra-corporeal development is essential before they can return to the host. The developmental conditions vary with each species and practically no two require the same set of circumstances. This fact is the basal explanation of the geographical distribution of helminths. The two exceptions referred to

are trichinosis, which is infective after encystment in the muscle, and the small cestode, *Hymenolepis nana*, a rare form in Canada. In the latter case, the eggs may be swallowed at once, the larval development taking place in the villi of the upper part of the small intestine, from which the worm emerges to develop to sexual maturity further down the small intestine of the same host; in other words, the parasite uses the same animal both as intermediate and as definitive host. This is a secondary and relatively modern adaptation and there is evidence to show that an insect may be substituted for man for the first part of the cycle.

All the helminths of man in Canada gain entrance to the body through the mouth, although in warm climates, such as the southern United States and the tropics, several important forms, such as hookworms, return to the host by penetrating the skin. There are some important animal parasites in Canada which do this also and reference will be made to them later.

Finally, few of the helminths are specific to human beings, and domestic and wild animals often act as reservoirs from which man may become infected—a fact which makes control somewhat complicated and often very difficult.

#### NEMATODA

Of the numerous species of round worms occurring in man, only one is common in Canada. This is *Enterobius vermicularis*, the human pinworm. It is extremely common in children in eastern Canada at least, but a study of its life-history shows that its prevalence is not a matter of public health control but of personal hygiene. The human whipworm (*Trichocephalus trichiurus*) and the round worm (*Ascaris lumbricoides*) are present in all parts of the world, but, while they do occur in the Dominion, their incidence is relatively low. They are commonest in countries where sanitation is poor and where night soil is used as fertilizer for market gardens.

Only one other roundworm deserves mention here. This is the trichina worm (*Trichinella spiralis*). When it does occur in man, it is one of his most serious parasites and every now and again we hear of quite serious outbreaks in the Dominion. Its human incidence has not been intensively studied but it is almost certain that an investigation would show that it is much more common than we believe. It is naturally a parasite of flesh-eating animals—dogs, cats, pigs, foxes, bears and so on—and in these hosts it is quite common in North America (extending into the Arctic regions). It also occurs in rodents which feed on infected flesh and experimentally it can be transmitted to almost any species of mammal. Human infection is caused by eating infected meat—pork, bear-flesh and so on—and as the symptoms vary so much, it is often unsuspected. Trichinosis is generally diagnosed at first as ptomaine poisoning, enteric fever or acute rheumatism, and it is only on admission to hospital that the true cause of the condition is suspected. Many minor outbreaks never come to the attention of the physician, and it is generally only the serious ones which receive attention. The differential diagnosis is generally difficult and depends on history, eosinophilia (which may, however,

be absent even in heavy infections), biopsy and other methods. Laboratory tests are in process of elaboration at present but have not reached a state of absolute reliability.

Prophylaxis depends on the habits of the people. Where pork is eaten overcooked, as a rule no previous inspection is necessary, but where it is eaten undercooked, it may be subjected to prolonged cold or pickling, or each animal may be inspected immediately after slaughter. Regulations for feeding pigs may be necessary but so far no steps are taken here to prevent infection. In any case, regulations apply only to pigs (and in Germany to dogs) and no notice is taken of wild carnivores. Several sharp epidemics have been traced to bearflesh.

#### CESTODA

Among the cestodes, several important forms occur in Canada. Both species of *Taenia* are found and their prophylaxis demands careful inspection of pork and beef, combined with adequate cooking. The taenias are not common in eastern Canada but there are quite a number of records in the west. Our own records, far from complete, indicate that there is an endemic centre of *T. solium* infection in Alberta and of *T. saginata* in Saskatchewan. While *T. saginata* is relatively harmless, the related *T. solium* is potentially very dangerous as man may act as an alternative intermediate host to the pig, and when he does, the cysts often develop in the central nervous system with most serious results. In both cases, of course, man is the only definitive host.

This is not the case with the fish tapeworm (*Diphyllobothrium latum*) which can live as adult in many fish-eating vertebrates such as dogs, foxes and bears, which cannot always be brought under human control.

It has been recorded in Canada from the St. Lawrence to the Rockies, but its chief centre appears, at present, to be south-eastern Manitoba to Lake Nipigon, in Ontario. The tapeworm requires two intermediate hosts—a fresh-water crustacean and a fresh-water fish, and as these are common throughout the Dominion there is no reason why the infection should not spread. Infection is caused by eating, in an undercooked condition, the larvae in the flesh of fish, of which the most important are the pike (*Esox estor*), the pickerel (*Perca flavescens*) and the sauger (*Stizostedion vitreum*). It has occasionally also been found in the perch (*Cynoperca canadense*). The worm develops in about three weeks after infection and it can live for at least five years.

Thorough cooking destroys the infective stage in the fish and a fair measure of control is obtained in the kitchen. The majority of the cases which come to the physicians' attention are found in Jewish women, who contract the infection during the preparation of *gefüllte fisch*.

The association of this tapeworm with anaemia is a problem that still awaits solution. In many cases, the host is apparently healthy, although often there is a small reduction in the size of the red cells. In a minority of cases, a form of pernicious anaemia appears coincidentally with the presence of the worm.

Still another species of tapeworm remains to be discussed. In this case, the adult tapeworm (*Echinococcus* spp.) occurs only in carnivores—wolves, dogs, foxes, etc.—and the larval stage is only accidentally found in man as the notorious *hydatid cyst*. It is not common in human beings in North America—there are under 500 cases on record—but it is quite common in moose and is not infrequent in pigs and other domesticated mammals. The cyst, which occurs in the liver or lungs as a rule, may reach the size of a child's head and causes very serious results. Diagnosis is relatively easy, but treatment can be attempted only by surgical interference. Man can be infected only by swallowing the eggs in food contaminated by faeces from dogs or wild carnivores, and as the cyst takes many years to grow, it is generally impossible to trace the origin of the infection. Hydatid cyst, while generally contracted in childhood, is essentially a disease of maturity. It is scarcely yet a public health problem, but as it is present in wild animals, it is always a potential danger. Accordingly, hunters should be advised to burn the offal of all deer, and game-wardens to destroy all obviously sick animals.

#### TREMATODA

No adult trematodes of any importance have yet been recorded from man in Canada, but we find dogs, cats and other fish-eating mammals quite extensively infected with fish-carried flukes—both liver flukes (related to the human liver-flukes in China and its relations in Siberia and Germany) and intestinal flukes (belonging to the family *Heterophyidae*). Fish of various kinds are heavily infected with the larval stages in the St. Lawrence area and, from analogy, it is probable that human infections do or will occur.

No bilharzia worms occur as adults in man in Canada, and although they may be introduced into the country from the Orient or elsewhere, they cannot, in the absence of the proper vector, become indigenous. There are, however, several related species in ducks and certain wild animals. Like the human species, these have a multiplication phase in snails and their larvae, emerging, penetrate the skin of the definitive host. The larvae can also, however, penetrate the skin of bathers, giving rise to a condition known popularly as "swimmers' itch", and, scientifically, as "cercarial dermatitis." This disease is apparently widespread in the Dominion—it is confined to fresh water, of course,—and is found in the United States, England and Europe. There are several flukes involved but in all cases the symptoms are the same.

The larvae cause a blister as they burrow into the skin. If the skin is dirty this may become a pustule. The fluke does not develop to maturity in man and it dies shortly after entering his skin. Consequently the condition is of minor medical importance but it is a cause of considerable irritation to bathers.

The larvae have a very short free life and domestic water supplies are perfectly harmless. It is still premature to discuss prophylaxis but probably copper sulphate can be employed to clear out snails from infected areas habitually used for bathing.

The time available does not permit of a fuller discussion of a most interesting

subject. Enough has been said, I hope, to show that we have several parasites in Canada of immediate, and many others of potential, public health importance. Often the latter are important economically in that they affect domestic, fur and game animals. We know little of their distribution and bionomics yet and it was largely with the purpose of putting our knowledge of these and similar forms on a sound scientific basis that the Institute of Parasitology was founded by the Empire Marketing Board, the National Research Council and McGill University. (Since the abolition of the former, the National Research Council of Canada has undertaken full financial responsibility for the Institute.) In addition to work which is being undertaken in connection with the bionomics of a number of these parasites, we are actively conducting a Dominion-wide survey of the incidence and prevalence of the internal parasites of man and the economically important animals. In this way we hope to be able to amass information which will not only be of value to those interested in the various groups of animals, but which will give the public health authorities accurate data on the parasites, actual or potential, of human beings in Canada.

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ANNUAL CHRISTMAS SEAL SALE  
CANADIAN TUBERCULOSIS ASSOCIATION



THE annual Christmas Seal Campaign of the Canadian Tuberculosis Association will be in progress in every province from now until Christmas. Canada is one of the forty-one countries affiliated with the International Union Against Tuberculosis carrying out a similar campaign. It is gratifying that last year's returns showed an increase of twelve per cent over 1933, and it is hoped that the improved economic conditions will be reflected in a further increase for 1935.

The funds over and above the cost of supplies are all spent locally. They carry on the preventive side of the campaign, and are used mainly for educational work and to subsidize diagnostic clinics and nursing services. In some places they provide x-ray services necessary for examination, and supervision of contacts. They also help to maintain summer camps for children.

The results of Canada's effort in tuberculosis control were shown in the mortality rate of 59.3 per 100,000 for 1934. The rate fell from 64.9 in 1933 and was the lowest on record in the history of the Dominion.

# The Medical Officer of Health and School Health in a Small Urban Municipality\*

W. H. BIRKS, M.D.

*Medical Officer of Health, Bowmanville, Ontario*

**S**CHOOL health may be measured by the number of pupil-days lost through sickness, and school health varies according to the interest of the health officer and the time which he gives to it.

It is not the purpose of this paper to draw a picture of a model health officer with an ideal school but to describe what can be accomplished in a town of less than 4,000 people where, of course, the medical officer of health is giving part-time services.

Of first importance in any plan of school health services is the provision of a well-trained, able and tactful public health nurse. The work of the health officer is made much easier if great care has been taken in making this appointment. Our community has been fortunate in having excellent public health nurses for the past ten years.

## *Control of Communicable Diseases*

In a small community it is feasible to have the nurse divide her time between school nursing and other public health activities. Naturally a large part of the nurse's school work and of the health officer's duties concern the prevention of disease. Under the direction of the health officer the nurse, by the inspection of the children in the classrooms and by home visits, keeps close supervision over all cases of communicable diseases. More important still, she checks carefully all contact cases. At the present time the spread of contagious skin diseases and such diseases as mumps, measles, chicken-pox, etc., can be controlled only by maintaining such vigilance.

In the last five years no cases of diphtheria have occurred among children of school age in our town. This has been accomplished by giving diphtheria toxoid each fall to as many as possible of the pupils entering school for the first time. Parents' consent for the administration of toxoid has been received for more than eighty per cent of the new pupils. It is felt that though 100 per cent has not yet been achieved, the danger of diphtheria of epidemic proportions is negligible. The administration of toxoid has required about two hours of the health officer's time each week for a period of eight weeks.

During the winter of 1933-34 there was a severe epidemic of scarlet fever in the town. Two deaths occurred. Early this year a few cases again appeared. It was considered to be an opportune time to start a campaign of scarlet fever immunization. An address was given by the health officer to a

\*Presented at the Twenty-first Annual Meeting of the Ontario Health Officials' Association, Toronto, June, 1935.

largely attended meeting of the Home and School Club, explaining the value of specific immunization against this disease. The local newspaper gave hearty co-operation.

Of 565 school children, 91 were known to have had scarlet fever. Of the balance, 373 were Dick tested, 181 being found negative (among these were 16 who at some time previously had received this preventive treatment). Of the remaining 192, 186 completed the series of five inoculations of scarlet fever toxin. The administration was completed in February. On May 20th and 21st, 166 of those who received the toxin were retested and 148 were found to be negative. Thus 420, or almost 75 per cent of the school population, were either immune as judged by the Dick test or had been rendered Dick negative by five doses of toxin.

The Department of Health very kindly loaned Dr. R. P. Hardman, Assistant Provincial Epidemiologist, for four days to assist in the Dick testing. His help was especially valuable in interpreting the readings.

No scarlet fever cases occurred after the toxin inoculations were started, which may have been just a mere coincidence or, more probably, the result of the very close attention given by the public health nurse to all contacts of the original cases.

#### *Value of School Nursing Service*

The regular inspection of the pupils by the public health nurse brings to light many defects which when brought to the attention of the parents are often corrected, thus preventing more serious illnesses. Through the co-operation of the local doctors who have given their services and the local Rotary Club which has paid the hospital expenses, it has been found possible to arrange each summer for a number of needy children to have their tonsils removed.

If the medical officer has time to give each child a physical examination, it is a great help, but not many of the part-time medical officers are able to give the necessary time. However, when the various immunizations are being given, there is a chance for the medical officer to note some of the more glaring defects. Also when he is in the school for such work the nurse can arrange for him to see any cases about which there is any doubt and they arrange for these cases to be seen by their family physician.

Because the nurse is at school each day, the teachers are able to refer to her every case of injury or indisposition. This enables the nurse to note at once cases of contagious diseases in their very early stages and greatly limits the spread of such diseases. Further, the nurse's visits to the homes of absentee pupils often reveal unreported cases of contagious diseases.

Teachers who make a daily inspection of their pupils for cleanliness of hands and faces often find early signs of disease. If there is no nurse to whom such pupils may be referred, the health officer should be consulted. He has the right to see all cases of contagious diseases or he may be satisfied to advise teachers to refer such cases to the children's family physicians and accept their reports. It is the duty of the health officer to assist school teachers in every way and so reduce the incidence of contagious diseases in the municipality.

It has been found that the giving of half a pint of milk each day to under-weight children has also helped to reduce illness. In most cases this milk is supplied by Home and School Clubs or by local service clubs.

The staffs of mental hospitals in Ontario have established mental health clinics in a large number of centres. It is the duty of the health officer to call the attention of the school teachers to the importance and value of referring children to such clinics. The health officer or one of his staff should act as a connecting link between the teachers, pupils and clinic.

#### *School Sanitation*

The health of the pupils depends also upon the sanitation of the school building. An annual inspection may be very casual, a mere filling in of a form, or it may be an inspection with the purpose of recommending to the school board the improvements necessary to bring the plant to a proper condition.

The report should cover not only the size and the drainage of the school grounds but the equipment for sport, *e.g.*, back stops and bases for baseball, goal posts for football, etc. A rink in the winter time is a great asset to the school. When the school board feels that it is not in a position to supply a rink or other sport equipment, it is often possible to have them supplied by one of the service clubs of the town. These clubs are usually very appreciative of any suggestions along such lines from the medical officer of health.

The water supply in most towns is of excellent quality, being tested regularly. The schools must have sufficient drinking fountains and there should be a sufficient number of these of easy access during recess periods. The angle type is preferable to the bubble type. The children should be taught to use a fountain without touching their lips to it.

Inspection of the lavatories should check such points as cleanliness and ventilation to ensure that no odours pass through the building. If necessary, special air vents should be installed. In our experience upright urinals have been found to be the only satisfactory type.

The rooms should be inspected to see that they are properly swept and dusted. An oily preparation should be used to prevent the raising of dust from the floors when swept or when used by the children during school hours. Inspection should disclose any overcrowding. This not only affects the health of the pupils but an overcrowded classroom means that the teacher cannot do her best work.

To prevent eye strain among the pupils, the health officer should see that the blackboards and desks are properly placed in relation to the windows. New schools do not have cross-lights. All rooms should have electric lights, if electricity is available, and these lights should be properly placed so as not to cause glare or to throw shadows on the pupils' desks.

Practically all the larger schools have found a low pressure steam heating system to give the most satisfactory results. In our experience this is best even in a two-room school. The only objection is the initial cost of installation but it is often more economical to operate. Frequently rooms are too hot. It is the duty of the teacher to watch the temperature of the room.

The room thermometer should be placed as centrally as possible at about the level of the pupils' heads.

The temperature should be kept as nearly as is practicable at 68°F. This has proved to be the optimum temperature with proper humidity and permits of the optimum efficiency of those in the classroom. Some schools have ventilating systems that take care of the humidity as well. These are satisfactory if properly operated but require careful supervision. To provide water vapour narrow tanks may be hung behind the radiators and kept filled with water. It is necessary that the teacher sees that this is done.

In one of our schoolrooms the teacher had a class of boys. The temperature last winter was kept at 65°F. All were comfortable and there were few colds. Another teacher who kept the room at nearly 80°F. had the largest number of pupils out of school with colds. Usually about 15 per cent were absent during the winter months.

The cheapest ventilating system is the window and if baffle boards or deflectors are properly placed this is often satisfactory. These deflectors should be made of glass so as not to block the light and should be placed in windows that are over radiators. In this way there is no down draft of cold air. One difficulty in keeping an optimum temperature is that the boys usually wear heavy suits and the girls are dressed lightly. Part of this difficulty may be overcome if the boys are seated near the windows which are opened and the girls are at the opposite side of the room.

#### *Health Teaching*

Health teaching in the classroom is essentially the work of the teacher. The health officer has not the time to do it. Even if there is a public health nurse she should not do the actual teaching. By means of conferences with the teachers she can be of great assistance to them and in many cases can outline suitable instruction. The nurse and the health officer should always be available to assist in selection of subjects that the teachers may use or in helping them to secure, through the Department of Health, necessary material.

There has been issued by the Provincial Government a "Teachers' Hand book on Health Teaching and Health Services." In addition there is available a summer course in health teaching for teachers. The health officer may well recommend these to the teachers in the schools under his care.

The Department of Health is ever ready to lend its aid through its Division of Public Health Education. If the health officer has any particular program that he wishes to present, the school teachers are his best assistants. The health officer should ever be ready to answer any questions the teachers may ask and to assist them in every way.

Thus the medical officer of health, even in a small municipality, may provide a reasonable program for improvement in the health of the school child. No specific reference has been made to rural schools, but there is little that has been suggested in this brief outline that cannot be undertaken in the schools of a township. As an essential part of such a program a school nurse should be available.

# Mortality from Respiratory Diseases excluding Tuberculosis

ONTARIO, 1880-1931

MARY A. ROSS, M.A.

*School of Hygiene, University of Toronto*

THE impression left by the 1918 epidemic of influenza is such that even the most casual observer might well ask "What is the actual history of influenza in the past 50 years in Ontario?" The answer, however, is unsatisfactory, because the mortality from influenza is inextricably mingled with the mortality from pneumonia and other respiratory diseases. Influenza is a disease lacking any clinically distinctive characteristic by which it might be diagnosed with any degree of accuracy or consistency and cannot, at present,

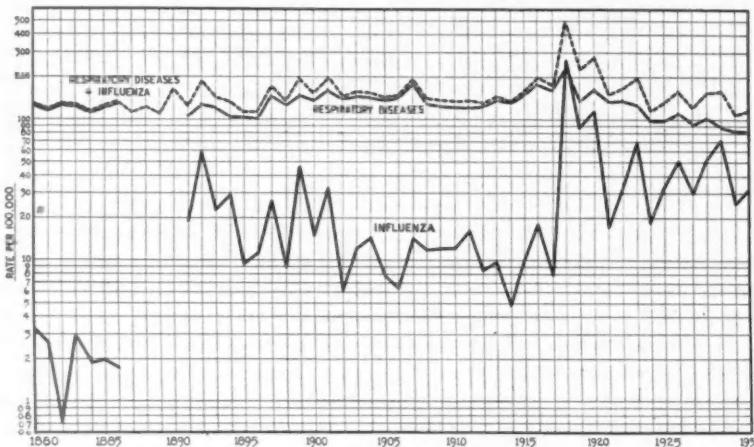


FIGURE I

Respiratory diseases (excluding tuberculosis), Ontario, mortality rate per 100,000, 1880-1931.

be separated from what appear to be complications and sequelae. There is no specific laboratory procedure for confirmation of the diagnosis. What one physician calls influenza, another may call pneumonia, another congestion, another bronchitis, etc., and the certificates of death are as varied, and as uncertain and inconstant in their terminology. This is abundantly plain in figure I. Here it is evident that in any period of definite increase in recorded influenza mortality there was also a decided increase in deaths charged to respiratory diseases. The only reasonable assumption is that the increase in deaths attributed to respiratory diseases resulted primarily from the prevalence of influenza, though not necessarily recognized, diagnosed or classi-

fied as such. The assumption that respiratory diseases assumed abnormal prevalence unrelated to influenza in each period when influenza was recognized as epidemic is not tenable. The present knowledge of the relationship of influenza to deaths charged to respiratory disease is such that further statistical evidence of that relationship is superfluous. Suffice the statement that recorded influenza mortality does not represent actual influenza mortality; and that the recorded data of influenza mortality have been so influenced by variations in diagnosis that detailed analysis or comparison of them in different periods is not warranted. As the deaths actually due to influenza may appear under influenza or under respiratory diseases, this analysis is made of the sum of the mortality charged to influenza and to respiratory diseases\* rather than of the recorded influenza mortality.

#### *The Effect of Improvements in Registration of Deaths*

Before comparing these deaths in different parts of the period under review, it is necessary to consider the influence which improvements in registration of deaths have had on the recorded mortality rates.

In 1880, but 60 per cent of deaths were registered, according to the estimates of the Inspector of Vital Statistics (R. B. Hamilton) for that period, and in 1898 but 85 per cent; it was not until about 1900 that approximately complete registration was attained. The data of respiratory deaths indicate with fair certainty that these improvements in reporting influenced the recorded respiratory mortality. Not only is there a generally higher level after 1900 than before, but this increase, as shown in figure IV, is mainly contributed by the extremes of life—age-groups which contribute the larger part of respiratory mortality and in which, it is reasonable to assume, reporting was most in need of improvement. It is entirely probable, therefore, that the rates from 1880 to 1900 should be significantly higher in order to reflect the true picture of mortality at that time.

#### ANALYSIS OF THE DATA

##### *The General Level*

In figure I the rates of mortality from influenza and respiratory diseases for the period 1880-1931 are shown. Making allowance for incompleteness of registration in the early years, it is remarkable that the sum of the rates should have maintained for over 50 years, with some notable exceptions to

\*Respiratory diseases include the diseases or conditions listed in the International Classification of Causes of Death in the later years of this survey under "Diseases of the Respiratory System." For earlier years, the data for certain diseases had to be taken from other headings: e.g., asthma was listed under "Constitutional Diseases" until 1896. As from 1887-1890 (incl.) there was not any sub-division of the various diseases or conditions affecting the respiratory system, a selection of the acute respiratory infections could not be made for those years, and for the sake of conformity the whole group was included for the whole period. As pneumonia, congestion, bronchitis and influenza account for 90 to 95 per cent of the whole group in the years in which the data are sub-divided, the inclusion of the other conditions with which we are not primarily concerned does not alter materially the quality of the data. Even if a sub-division had been made for all years, the changes in diagnosis and tabulation have been such that a more specific selection would be subject to gross error. It is obvious, however, that conclusions based on comparisons of different periods should be most guarded.

be discussed later, the fairly constant level shown. Respiratory diseases, with influenza, accounted for over 200,000 deaths over the whole period, 11 per cent of all deaths from 1880-1884, 12 per cent from 1927-1931. Respiratory diseases, with influenza, are as great a cause of death to-day as half a century ago. They have not been susceptible to the various factors, known and unknown, which have reduced mortality from typhoid fever, scarlet fever, diphtheria and tuberculosis. As is shown later, the constancy of the general level is common to all age-groups, both sexes, and to both urban and rural populations. That being the case, there is nothing in different periods, in so far as the general level is concerned, for comparison or contrast. What part *endemic* influenza has had in maintaining the *general* level, what part it has contributed to that mortality, cannot be measured. It is altogether likely that in so far as the *general* level is concerned the influence of influenza has been fairly constant.

#### *Deviations from the General Level*

But the notable exceptions mentioned, the deviations from the general level, the upswings from the usual rates, the excess of mortality, the peaks, are another story. These give a picture of epidemic influenza mortality much more truly than the recorded influenza rates. These signify influenza in epidemic form. In fact, such deviations from the usual level are diagnostic of epidemic influenza. The statistician, therefore, seeing a sharp upward swing in total respiratory mortality, can detect the prevalence of epidemic influenza with possibly more accuracy than can the clinician examining the isolated case. But when the disease is not epidemic and the mortality from respiratory diseases is not raised, neither the clinician nor the statistician can segregate the deaths properly attributable to the non-epidemic form. While, therefore, the peaks in rates of respiratory disease plus influenza allow some study of influenza in epidemic form, and, in fact, segregate with some degree of accuracy deaths properly attributable to influenza in epidemic periods, it is impossible to compare or contrast those deaths with the influenza deaths in non-epidemic periods which are segregated neither clinically nor statistically.

*The 1890 Epidemic.*—The first distinct departure from the usual level occurred in 1890 and, though there was some decline in 1891, the rate in 1892 was greater than had been recorded previously. Whether or not higher rates of respiratory disease deaths occurred in 1892 than in 1890 it is impossible to say on account of the uncertainty of data of that period. These sharp deviations from the normal, however, in themselves indicate with practical certainty the existence of epidemic influenza. Although influenza deaths were not classified separately in the reports from 1887-1890 (inclusive) the existence of epidemic influenza was well recognized in the latter year. This epidemic of influenza, the first recorded in Ontario, is commented on in the Report of the Provincial Board of Health (Dr. Peter H. Bryce, Secretary) for 1890 as follows:

"The year 1890, remarkable as being in many respects free from extended outbreaks of

smallpox and other contagious diseases, recognized under the Public Health Act, was even more memorable as being that which brought to the notice of the larger portion of the present generation an illustration of those infections, or pestilences which history has handed down as sweeping from time to time in short periods over the whole world.

"The disease presented most diverse phenomena, and almost every character marking it in other countries was illustrated in the epidemic in Ontario.

"Superadded to the influenza with its febrile and catarrhal manifestations were pneumonia complications of every variety; neuralgias, general and localized, dominated all classes in adults; while great nervous depression during the acute stage of the disease with extreme subsequent neurasthenia in very many instances was among its most marked characteristics. Gastroenteric troubles occurred to a notable extent, and in some instances a temporary but marked jaundice was present.

"During the months which have followed the epidemic, numerous instances have occurred where neurasthenias and pneumonic complication ending in phthisis, have had fatal terminations.

"Probably the most nearly correct date for its epidemic appearance is December 20th, 1889. Its decline as an epidemic would be about the end of February, 1890.

"The disease was pandemic in Ontario, and prevailed very generally in Manitoba and the North-West Territories."

*The Outbreak of 1897-1901.*—It is to be noted that in 1892 the greater part of the excess mortality was attributed to influenza, a smaller part of the excess being attributed to respiratory diseases. Then, after four years of apparent absence of excess mortality from any widespread epidemic of influenza, the curve of respiratory disease mortality plus influenza took a decided upswing in 1897, but, following the absence of recognized epidemic influenza, the larger part of the increase was attributed to respiratory disease whereas two years later, 1899, the larger part of the excess mortality was attributed to influenza. Following some decline in the next year, the rate rose abruptly again in 1901 and this time the excess was contributed nearly equally, according to the records, by influenza and respiratory disease. While, on account of the rapidly changing degree of reliability of the data of that period, comparison of the height of the peaks is futile, it is to be noted that definitely high rates did precede and follow the outbreak recognized in 1899.

As the wave of respiratory mortality usually increases from its ebb in August and September to its crest in the last and first quarter of the year, the data of the calendar year may distort the true picture and spread the effect of one epidemic over two years. In order to avoid this error, the data since 1897 are plotted by the September to August year (figure II). Monthly data for the earlier period are not available. The peaks of the data thus tabulated are not, of course, fairly comparable with the peaks of the calendar year mortality.

The rates from 1901-1902 to 1905-1906 give no indication of any epidemic effect in that time and, in fact, throw grave doubt on the quality of the data of recorded influenza mortality for which the rates were quite irregular. If an epidemic prevailed during that period, it was not of sufficient virulence or extent to influence the level of mortality from respiratory disease and influenza combined.

*The Epidemic of 1907.*—But the extent of the upswing in 1906-1907, an excess of 27 per cent over the average of the previous five years, leaves no room for doubt as to the existence of an epidemic. No word of recognition

of the existence of an epidemic at that time appears in the reports of 1906 or 1907 of either the Registrar-General or the Provincial Board of Health. It is to be noted that, again following the absence of influenza, most of the excess was charged to respiratory disease.

*The 1908-14 Interval.*—For the next eight years, 1907-08 to 1914-15, the data show no significant deviation from the general level, although it is possible that the small peaks indicate epidemics of limited extent or lower virulence. The rate of 154 in 1914-15 is, however, the highest obtaining since 1907.

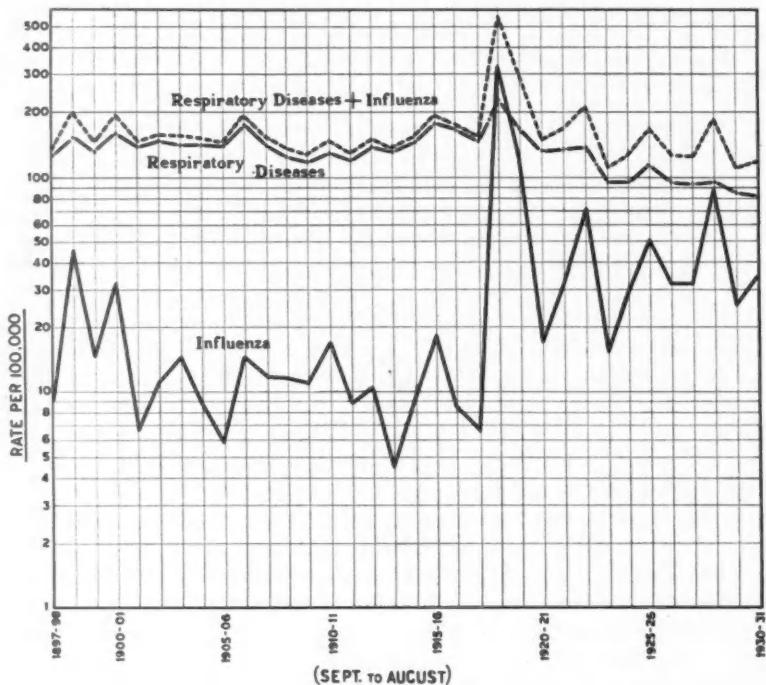


FIGURE II  
Mortality rates, annual, September to August, 1897-1931.

The 1915-16 rate of 193 equals the high rate of 1906-07 and even the rate of 175 in 1916-17 is definitely higher than the average for the 1908-15 period. Though the rate in 1917-18 fell to 154, it is apparent that for four years previous to the great outbreak in 1918, respiratory deaths had reached abnormally high rates.

*The 1918 Outbreak.*—In 1918-19 the combined rate rose with precipitousness to an unprecedented peak of 558 per 100,000 and influenza, epidemic and

pandemic, was recognized and the mortality charged thereto was for the first time on record higher than that charged to respiratory diseases, which, however, showed an excess of 77 per cent over the average of the rates for the period 1908 to 1915. Recorded influenza showed an excess of 3,200 per cent and the combined rate had an excess of nearly 300 per cent over the combined rates for the period indicated. In 1919-20 the combined rate was 288 per 100,000, practically double the rates of the pre-pandemic period, the larger part of the excess being charged to influenza. In 1920-21 the rate fell to 149, very close to the rates obtaining previous to the 1918 outbreak.

**1921-1931.**—Since then there have been three distinct peaks with rates of 210 per 100,000, the highest, in 1922-23; 165 in 1925-26, lower, it is to be noted, than the rate of 1915-16; and 186 in 1928-29. It is to be noted, too, that in 1922-23, 1924-25 and 1928-29 excess mortality was charged almost wholly to influenza, while in 1925-26 respiratory diseases were credited with a larger part of the excess. It is altogether likely that this is a difference in diagnosis only.

This review of the excess mortality in respiratory disease plus influenza, in other words of epidemic influenza, might be summarized briefly at this juncture as follows:

Ontario, from 1880 to 1931, experienced four distinct periods of influenza, the first, 1889-1892, the second 1897-1901, the third, not recognized at the time, 1906-07. The fourth, and greatest by far, began as early possibly as 1915, and shows repercussions as late as 1923 and possibly as late as 1929. According to these data, the marked explosive outbreak in 1918 was not the first departure from the normal but was preceded for some years by abnormally high rates which were part and parcel of the influenza outbreak. These data support the hypothesis that epidemic influenza is an abnormally severe outbreak, an acute exacerbation, of an endemic disease, rather than one due to an infection which dies out between epidemics, occurring again only with a new importation of the infection. (This hypothesis has, of course, been postulated by others, and is fairly established. Specific reference, with acknowledgment, is not made to such publications as this communication concerns Ontario data only.)

#### THE INFLUENCE OF AGE, SEX, SEASON, ETC.

##### Sex

*The General Level.*—For analysis of age, sex, etc., data for the calendar years have been used as the monthly data are not given in these details.

Specific rates for sex for the mortality from respiratory disease and influenza combined are shown in figure III. The male rates are consistently above the female rates in nearly every year, but the difference is not great.

*The Excess Mortality.*—In 1918, the male rate was twenty per cent greater

than the female rate. As a general rule, however, in peak years of mortality

the female rate closely approaches the male rate. With the exception of 1918, therefore, the female has contributed proportionately more to the excess mortality, that is, to epidemic influenza, than has the male.

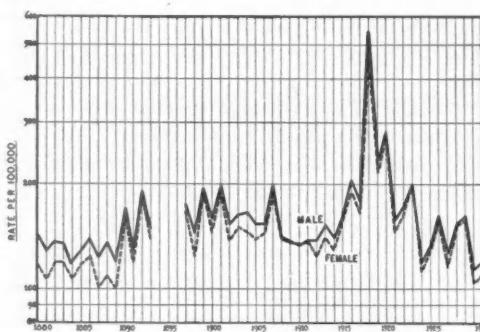


FIGURE III

Male and female mortality rates, 1880-1931.

influence of improved registration for infancy and to a greater extent for old age is plainly evident. Otherwise these data indicate, as was stated previously, that the rates in all age-groups have maintained the general level of inter-epidemic periods with no definite evidence of decline or increase in any one group. While the rates in the 5-9 year group suggest a slight decline, it is

#### Age

##### *The General Level.*

Age specific rates are shown in figure IV. The

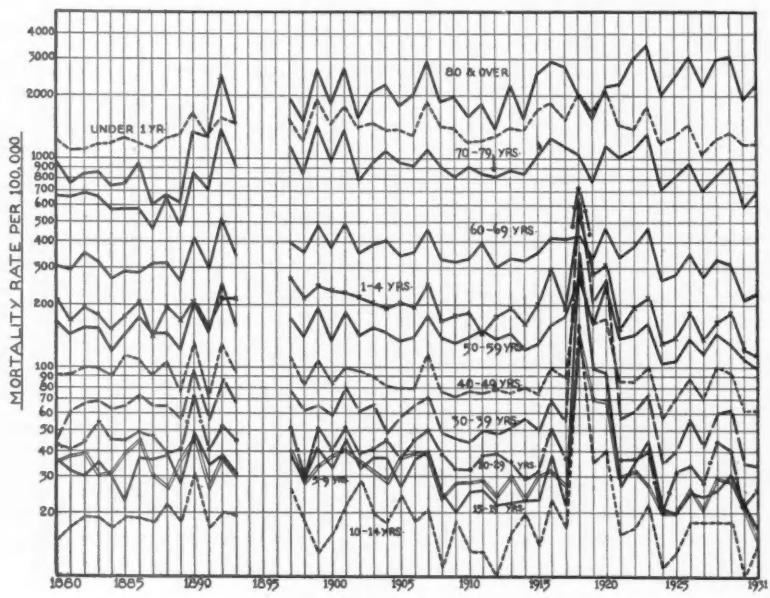


FIGURE IV  
Age specific mortality rates, 1880-1931.

much too poorly defined to be significant. The extremes of life, infancy and old age, show the highest rates. The rate for the 1-4 year group is approximately seven times the rate in the 5-9 year group. The lowest rates for the non-epidemic periods are in the 10-14 year age-group, after which age the rates become progressively higher throughout life.

It is evident in table I that, in keeping with the difference in rates in various age-groups, the extremes of life, infancy and old age, make the largest

TABLE I  
DISTRIBUTION BY AGE FOR CERTAIN PERIODS

Age	1880-84		1908-12		1918		1930-31	
	Deaths	Per cent	Deaths	Per cent	Deaths	Per cent	Deaths	Per cent
0-1.....	2855	23.8	3445	20.2	1194	8.5	1367	18.0
1-4.....	1812	15.2	1762	10.4	1285	9.2	597	7.8
5-9.....	424	3.5	325	1.9	398	2.8	121	1.6
10-14.....	214	1.8	154	0.9	418	3.0	79	1.0
15-19.....	361	3.0	286	1.7	884	6.3	122	1.6
20-29.....	813	6.8	850	5.0	3425	24.6	267	3.5
30-39.....	678	5.7	854	5.0	2699	19.3	346	4.5
40-49.....	788	6.6	1049	6.1	945	6.8	531	7.0
50-59.....	858	7.2	1393	8.2	650	4.6	640	8.4
60-69.....	1153	9.6	2105	12.4	665	4.7	899	11.8
70+.....	1589	13.3	4610	27.0	1254	9.0	2647	34.8
N. S.....	414	3.5	210	1.2	163	1.2	3	—
Total.....	11,959	100.0	17,043	100.0	13,980	100.0	7,619	100.0

and the 5-19 year group the least contribution to inter-epidemic mortality from respiratory disease and influenza combined. The apparent shift in the age distribution of mortality from inter-epidemic respiratory disease, including influenza, is explained partly by the change in constitution of the population (table II) and partly by the much more complete reporting of deaths, especially in the extremes of life, in the later period and by the fact that a much smaller part of deaths in later life are now attributed to old age. In 1880-84, 50 per cent of deaths over 70 were charged to old age; at the present time but 4 per cent are so classified.

TABLE II  
POPULATION—ONTARIO  
Per cent Distribution by Age  
1881 and 1931

Age group	1881	1931
Under 1 year....	2.6	1.7
Under 5 years....	13.0	9.0
Under 10 years....	26.0	19.0
10-59 years....	68.0	71.0
60 and over.....	6.0	10.0

*The Excess Mortality.*—In 1890, making allowance for the uncertainty of the data at that time, all age-groups apparently contributed to excess mortality in fair proportion to their contribution to the usual level of mortality from respiratory diseases plus influenza; that is, all age-groups showed practically equal percentage increases. The under-5 year group is a possible exception but the data are not sufficiently reliable to

warrant any conclusion in this regard. In 1899 the same tendency is evident although the 5-9 year age-groups showed a smaller relative increase than

other age-groups, the 30-39 year age-group still smaller and the 10-14 year group a definite decline. But, again, the character of the data is such that too close comparison leads to possibly erroneous or doubtful conclusions. So, too, the 1907 data show increases fairly proportional to the usual contribution of the different age-groups. It will be realized, of course, that the absolute increases were of altogether different magnitude.

Accepting, with some slight mental reservations on account of the uncertainty of the data, that the earlier outbreaks, 1890, 1899 and 1907, showed excess mortality reasonably proportional to inter-epidemic mortality, the findings in 1918 make a striking contrast. In 1918 the 20-29 age-group showed a much greater increase, absolute and relative, than any other age-

TABLE III  
1918 AGE SPECIFIC RATES COMPARED WITH 1908-12 AVERAGE RATES

Age Group	1908-1912 Average Rate per 100,000	1918 Rate per 100,000	Increase	Percentage Increase
0-4	502	853	351	70
5-9	27	138	111	411
10-14	13	159	146	1,123
15-19	24	352	328	1,367
20-29	36	720	684	1,900
30-39	48	641	593	1,235
40-49	76	288	212	279
50-59	140	273	133	95
60-69	336	430	94	28
70-79	886	1,045	179	21
80+	1,710	2,080	320	19
Total	137	497	360	263

group, the 15-19 age-group a slightly smaller *relative* increase followed in order by the 30-39 group, the 10-14 group and 40-49 group. The relative increases in the age-groups 0-4 and 50-59 were approximately equal, while the age-group of 60 and over (see table III) showed but 20 per cent increase. In 1918 the 20-29 age-group, forming 17 per cent of the population, contributed 25 per cent of all mortality from respiratory diseases plus influenza; its usual contribution was 4 to 5 per cent. In other words, in 1918, as is well-known, the 20-29 age-group and to a slightly less extent those immediately younger and older, suffered from the causes of excess mortality incomparably more than other groups and out of all proportion to their liability to death from inter-epidemic respiratory disease, including influenza.

This is evident, too, in table III showing excess combined mortality, absolute and percentage, over the average mortality for the period 1908-1912. The ratio of the 1918 rates to the average of the 1908-12 rates for the various age-groups is shown in figure V. The 20-29 group suffered twenty times the previous average rate while infants and the 50 and over age-groups suffered less than twice the former rates. Apart from the extreme rate in 1918, this

marked shifting of the mortality is the most striking characteristic of the outbreak.

A similar shifting, though to a much less extent, is evident in the ratios of the rates in 1919 and 1920, and even in 1923 the age-groups of 10-20 and 30-40 show greater deviation from the 1908-1912 level than do other ages with

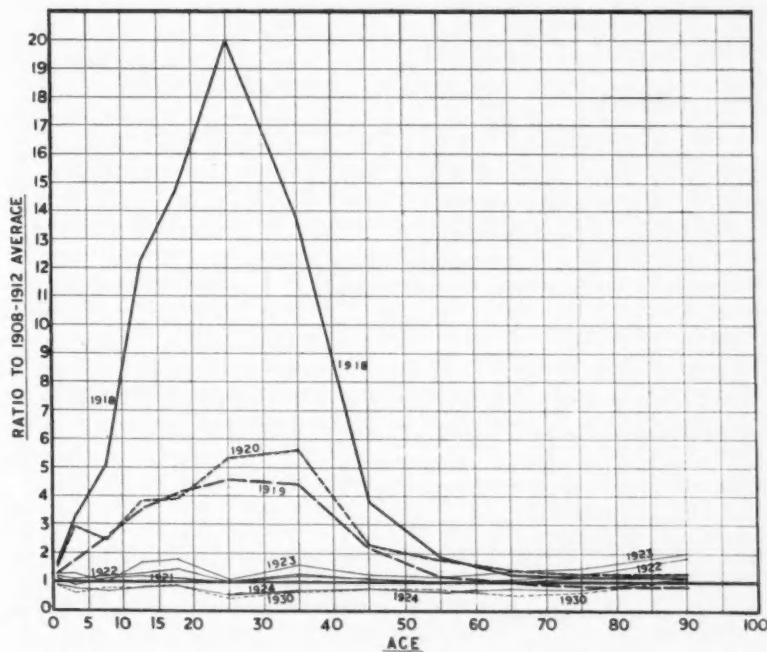


FIGURE V

Comparison of Specific Age Rates for Certain Years, Average of 1908-12.

the exception of the 80 and over group. In other years since 1918 the differences are small, the ratio lines being so close to the 1908-1912 level that such differences as there are appear insignificant although they are slightly more marked than those of any individual year of the 1908-1912 period.

#### *Age and Sex*

The data for age and sex together are available only for the two periods 1880-1890 and 1921-1931; the rates are shown in figure VI. The consistently greater rates in males than females in infancy from year to year in both periods are suggestive of significance. It is regretted that the information for the whole period is not available in order that this suggestion of significance might be checked. Obviously, such a difference in this early age, if true, can be attrib-

uted only to greater susceptibility to respiratory mortality on the part of the male. This suggestion, however, requires further investigation. At no other age does the factor of sex appear to play any important part.

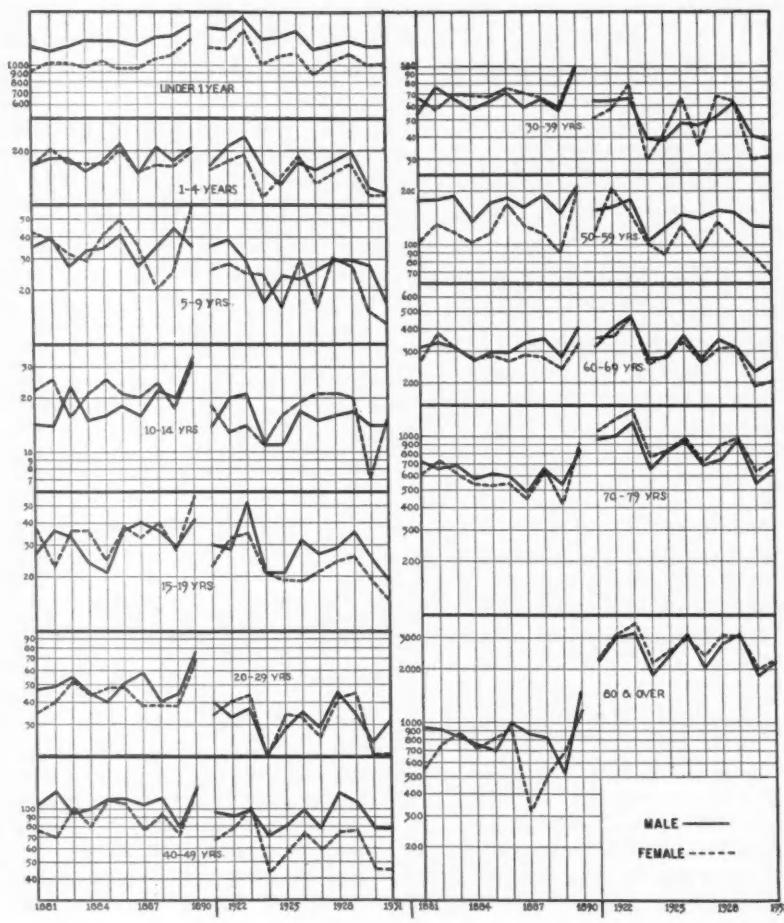


FIGURE VI  
Mortality Rates by Age and Sex, 1881-1890 and 1921-1931.

#### *Rural and Urban\**

To gain any true indication of the influence of environment, rural or urban, on mortality from respiratory disease and influenza, the rates would have to be subjected to much more detailed comparison than is possible with the available data. Not only would the mortality rates for communities of

different concentrations of population be required but the age distributions of those populations would also be necessary, allowing thereby standardization of the rates. Without this such differences as are shown in figure VII are without any certain significance. Factors other than environment, *per se*, influence these rates, but to an unknown extent.

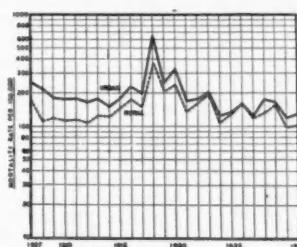


FIGURE VII  
Urban and Rural Mortality Rates,  
1907-1931.

While 11 per cent of deaths were charged to old age in 1900, but 1.6 per cent were so charged in 1931. This change in diagnosis (it may or may not be improvement) may have, probably has, influenced rural rates more than urban rates. The age distribution of these so-called rural and urban populations may well be sufficiently different to give the differences noted here. So, too, the distribution of both of the populations may have changed sufficiently to account for the decrease in the difference of the rates. Another factor that makes these rates unsafe for comparison is that the deaths on which they are based were not allocated to place of residence. These deficiencies in the character of the data make any comparison of the rates of questionable value. Perhaps the generalization that the rural rate corresponds fairly well with the urban rate is the only one justified.

#### Season

The data since 1897 have been analysed for season and the monthly rates calculated. Respiratory deaths regularly fall to their lowest levels in August and September. In the 35 years the peak occurred in March 15 times, in February 10 times, in January 4 times, in April 4 times and in December once. The usual swing is from a low monthly rate of approximately 40 to 50 per 100,000 in August and September to 200 or 300 in the peak months, a five-to six-fold increase. The influence of season on respiratory mortality is thus evident.

The year 1918 shows a distinct departure from the usual seasonal curve. The rates of December, 1917, and January and February, 1918, were practically equal. The March rate shows what would appear to be the usual seasonal decline. Instead of continuing the decline then, as was usual in past experience, the rate rose fairly abruptly, giving a well-marked peak in April. Following this abnormal peak, the curve approximates that of other years until

\*The term "urban" as used in this study includes towns and cities having a population 5,000 or over. This is not the most desirable division as there is not a marked difference between towns of 5,000 and 3,000 with respect to sanitary facilities, environment, etc., but deaths for towns of less than 5,000 are not shown separately in the reports except in very recent years (1926-1931). While deaths are charged to certain municipalities throughout the whole period under review (1880-1931), reliable information of the population of these municipalities in the early period is not available.

October, which month showed a 25-fold increase over September, instead of the usual increase of 50 to 75 per cent. For the next three months the rates fell but still contributed a considerable portion of the excess mortality of 1918 and 1919. It is evident, therefore, that the outbreak of influenza in 1918

TABLE IV

AGE DISTRIBUTION OF DEATHS—ONTARIO  
1931

Age groups	Deaths	Per cent
Under 1.....	687	17.5
1-4.....	292	7.4
5-14.....	96	2.4
15-19.....	50	1.3
20-69.....	1,363	34.6
70 and over.....	1,448	36.8
Total.....	3,936	100.0

TABLE V

POSITION AS A CAUSE OF DEATH IN CERTAIN  
AGE GROUPS, 1931

Age	Respiratory Deaths	Position as Cause of death
Under 1.....	687	Third
1-4.....	292	First
5-14.....	96	Second
15-19.....	50	Third
20-49.....	587	Fifth
50-59.....	307	Fourth
60-69.....	469	Fourth
70 and over.....	1,448	Third

was not only preceded by abnormally high rates in preceding years, but the explosive phenomenon was preceded in Ontario, as elsewhere, by abnormally high rates in the previous spring; this is further evidence against an importation of infection in the fall. The epidemic years since 1920 have shown seasonal distributions similar to those in non-epidemic years.

*The Present Day Problem*

Of utmost significance, as it is, little is to be said of the present day problem of mortality from respiratory disease including influenza. Nor is the problem evident only in the volume of mortality of to-day but in the menace of the future, there being no evidence that our changed life over the past 50 years or our efforts at control have had any influence on the mortality. In 1931, a year not marked by abnormally high rates, 3,936 deaths were charged to these causes. These deaths were distributed as shown in table IV. The relative position as a cause of death in different age-groups is shown in table V. Exceeded only by prematurity and diarrhoea and enteritis in the first year of life, standing as first cause in the pre-school group, second in the school group, third in the 15-19 group and fifth with 587 deaths in the 20-49 age-group, the importance is sufficiently evident to require no further comment. In the 50-59 group it is in fourth place, still fourth in 60-69 and third in the 70 and over age-group. This volume of death, especially that part in the most active age-groups of life, indicates a public health problem of utmost significance and one for the conquest of which mortality data show no encouragement. If this volume is to be reduced in the next fifty years, some measures of control which we either have not or have not applied will be necessary. Here is surely a vast field for more intensive research.

## SUMMARY

The recorded rates of influenza mortality do not reveal the true influenza mortality, a large part of which is included under respiratory diseases. The deaths charged to respiratory diseases and influenza are therefore reviewed in this survey. The larger peaks in this mortality indicate epidemic influenza.

The recorded rates from 1880-1900 are lower than the actual rates on account of incomplete registration of deaths in that period.

There has been no decline in mortality from respiratory diseases including influenza in any age-group or in either sex in the 52 years.

The extremes of life show the highest rates, the 10-14 age-group shows the lowest rates.

In infancy, the male mortality rates are slightly higher than the female rates. At other ages there is no indication that sex is a significant factor.

This mortality has a distinct seasonal distribution, falling to the lowest point in late summer and increasing five- or six-fold to a peak in late winter.

Mortality from respiratory diseases including influenza accounts for 12 per cent of all deaths and ranges from first to fifth place as a cause of death in the different age-groups throughout life. This mortality constitutes therefore a public health problem of first magnitude. The data show no indication of control. Intensive research work is indicated by the present volume of death and an apparent inability to cope with it.

The peaks of total respiratory mortality indicate four periods of epidemic influenza in Ontario, the first 1889-1892, the second, 1897-1901, the third not recognized at the time, 1906-1907, and the fourth and by far the greatest from 1915-1923, with well marked outbreaks in 1925-26 and in 1928-29.

In the years 1918, 1919 and 1920 the age-groups between infancy and old age, especially the 20-29 group in 1918, suffered much more *excess* mortality than did the extremes of life. This shifting in distribution of mortality is one of the most notable features of the outbreak.

The data presented support the hypothesis that epidemic influenza is an exacerbation of an endemic disease and not a disease dependent on new importation of infection at each explosive outbreak.

The Editorial Board will appreciate receiving  
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MAY, 1918 (Vol. 9, No. 5)

JANUARY, 1932 (Vol. 23, No. 1)

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### THE ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

THE annual meeting of the American Public Health Association, of which the sixty-fourth was held in Milwaukee in October, has always been the occasion for reviewing public health progress on this continent. The growth of public health is reflected in the Association, which now embodies ten sections each concerned with a special field, in the extensive organization of the central office providing for the work of the numerous permanent committees, and in the attendance at this meeting of more than 2,500 members and guests.

The annual meetings of recent years had recorded with anxiety the effect of economic conditions on health administration, and the consideration of health budgets and the maintenance of efficiency under existing conditions had formed a large part of the formal and informal discussions. This year, however, the improvement in conditions and the passage of the Social Security Act in August, which includes among its provisions the expenditure of \$11,800,000 for specifically-named public health purposes, have given a new outlook and provided discussions, in the Association as a whole and in the Sections, of the implications of the act and the development of plans.

The act provides for the expenditure of \$8,000,000 as an aid to state departments of health in providing infant and maternal care in rural areas where no program has been undertaken and for crippled children's work. This sum is to be expended under the direction of the Children's Bureau, Washington. An amount equal to that contributed by the federal authorities must be provided by the state and local departments. Provision is made for extending the research activities of the United States Public Health Service by the allocation of \$2,000,000. The training of new personnel and the providing of short courses for those engaged in administrative work in state and local departments will be made possible through funds to the extent of \$1,500,000.

This federal action is highly significant, being the first occasion of the participation of the federal government in a country-wide program of assistance to state departments in public health work. While the funds have not been voted by Congress, it is expected that action to this end will be taken early in January. It is realized that Congress is not bound to appropriate the whole amount and that the vote must be considered each year. The continuation of this federal

aid will depend on what is accomplished. Although the Social Security Act deals with such matters of social welfare as old age pensions and unemployment aid, no reference is made to the furnishing of medical services to that section of the community unable to pay for proper treatment or to indigents, the providing of which may reasonably be considered an integral part of a public health program.

In his presidential address Dr. E. L. Bishop, Director of Health of the Tennessee Valley Authority, expressed the note which characterized the meeting: that the public health services have the greatest opportunity in history and that the campaign for a nation-wide program can be rapidly carried forward. He stressed the need for the adequate provision of health services for everybody; the elimination of overlapping of state and local health programs; the making of public health a "career service"; the elimination of politics; and the extension of basic research.

Although not the subject of a formal paper, a topic of frequent discussion among health officers was the national survey of chronic illness which is now being undertaken under the direction of the United States Public Health Service with funds amounting to \$3,400,000 provided from the Works Progress Administration. An extensive questionnaire has been prepared and it is hoped to obtain information concerning such ailments as heart disease, rheumatism, diabetes, cancer and digestive disturbances and the effect of such illnesses on economic and social conditions. Information will be obtained from hospital records and a house-to-house canvass will be made of 750,000 families in nine cities and nineteen states selected as representative of the general population and income levels. The survey will serve as a "health inventory", including available medical and nursing facilities and the use made of existing services.

The meeting provided a frank expression of opinion, by those qualified to express it, of the value of two vaccines used recently in the United States for the prevention of poliomyelitis. Dr. Maurice Brodie of New York presented the results obtained with the Park-Brodie vaccine and Dr. John Kolmer of Philadelphia outlined the preparation and use of the vaccine which he introduced. Dr. Brodie's vaccine consists of a ten per cent emulsion containing 0.1 per cent of formalin of brain and cord tissue of typically paralyzed monkeys following inoculation with poliomyelitis virus. The vaccine is considered to be incapable of producing poliomyelitis when inoculated into monkeys. To date approximately eight thousand persons have received this vaccine. Dr. Kolmer's vaccine consists of a four per cent emulsion of cord and brain tissue of inoculated monkeys containing one per cent of sodium ricinoleate. The virus is not killed but the author believes that it is definitely attenuated. It thus differs from Dr. Brodie's vaccine in that living virus may be obtained from it. Dr. Kolmer estimated that twelve thousand persons have received this vaccine. The two papers were discussed by two outstanding authorities, Dr. Thomas Rivers of the Rockefeller Institute for Medical Research and Dr. J. P. Leake of the United States Public Health Service. These authorities stated frankly that it was their belief that Dr. Brodie's vaccine, provided that the present content of formalin and the method of preparation were maintained, would probably prove

to be not harmful but ineffectual; and, in reference to Dr. Kolmer's vaccine, that there was no proof that the virus was attenuated and that the occurrence of a series of eight cases of poliomyelitis after vaccination might be definitely associated with the presence of living vaccine in the virus. It was their considered opinion that this vaccine was not safe.

The action of the Governing Council of the Association in approving that steps be taken by the Association with the United States Public Health Service to prevent undue newspaper publicity being given to the occurrence of poliomyelitis, as it so frequently results in serious and unnecessary restriction of travel and in needless alarm, will meet with the hearty approval of health officers.

One session was devoted to a review of the activities of the Committee on Administrative Health Practice of the Association in view of the completion of fifteen years of service. The work of this committee grew out of the survey of state health departments made by Dr. A. V. Chapin in 1915. Commencing its work in 1920 the committee has added new achievements from year to year. It has had five main objectives: the collection of data, the formulation of a normal health program, the preparation of a suitable appraisal form for municipal health work, the making available to health officers the knowledge so gained and, finally, the securing of public support. In 1923 the first appraisal form was prepared, the first survey undertaken, and a volume published on community health organization. Since then, cities, rural communities and state departments have been surveyed and the findings published in reports. It is only when the objections and the differences of opinion which were expressed when the committee first considered the publication of an appraisal form are realized that the courage of the committee in introducing it is appreciated. Similarly, the suggestion made in 1923 that the Association might give awards to the winning cities in the health conservation contests as sponsored by the National Chamber of Commerce met with marked opposition but the subject was again discussed at the Association's meeting in 1926 and was finally endorsed in 1929. The value of these contests as a stimulation to local effort and of the expression of commendation by the Association is evidenced by the introduction this year of similar contests for county health units. Considering the needs of today the committee realizes that an up-to-date review of current procedures, with a critical analysis of costs and results, is required. To this committee health workers throughout Canada are indebted for its excellent work and its constant willingness to place its findings at their disposal.

One of the features of the meeting was the presentation by Dr. Wm. Park to Dr. Haven Emerson, a past president of the Association and Professor of Public Health Practice in Columbia University, of the Sedgwick Memorial Medal for distinguished service in public health.

Milwaukee possesses a municipal auditorium building which is almost ideal for conventions. The lecture halls are conveniently arranged, with good acoustics. Attractive space is provided for exhibits and in every way the arrangements are most satisfactory. The exhibits, both commercial and scientific, were of a high order of excellence and deserve high commendation. The American Public Health Association is to be congratulated on the excellence of the meeting.

# MENTAL HYGIENE

## THE ONTARIO MENTAL HOSPITALS ACT, 1935

B. T. McGHIE, M.D.

*Acting Deputy Minister of Health for Ontario, Toronto*

AT the 1935 session of the Legislature of the province of Ontario an Act was passed entitled "An Act Respecting Mental Hospitals and Schools". This Act came into force by proclamation on August 1, 1935.

One purpose of this Act is to consolidate and bring into uniformity the provisions formerly contained in The Hospitals for the Insane Act, R.S.O. 1927, chapter 353; The Ontario Hospital, Woodstock, Act, R.S.O. 1927, chapter 356; and The Act to Confer Certain Powers Respecting Hospitals on the Lieutenant-Governor-in-Council, 1920, chapter 108. In addition there are several innovations in regard to the admission and treatment of patients in provincial institutions.

Four types of patients come within the application of this new Act; namely, mentally ill, mentally defective, epileptic and habituate. The terms "mentally ill" and "mentally defective" are defined in the Act and together comprise that great group of patients which have been formerly described as "insane and dangerous to be at large" and "idiots". Hence it has been unnecessary to use the terms "insane", "insanity" and "idiot" throughout the Act and these terms will no longer be applied to any patient in provincial institutions, nor will the terms appear henceforth in any of the commitment forms. The term "epileptic" retains its former and customary meaning. The term "habituate patient" or "habitué" includes both drug addicts and patients suffering from alcoholism.

At this point a word of explanation is in order as to the terms which will be applied to the different institutions in which patients will be treated. The term *Ontario Hospital*, followed by the name of the place where the

hospital is situated, will continue to apply to those institutions in which mentally ill patients will be treated, e.g., Ontario Hospital, Brockville; Ontario Hospital, Kingston; Ontario Hospital, Toronto. The institution at Orillia for the care of mentally defective patients will be called the Ontario Hospital School, Orillia. The Ontario Hospital, Woodstock, will be reserved for the care of epileptic patients. The Minister of Health is given power to establish diagnostic centres known as *examination units* wherever he may deem such a service to be necessary. The examination unit may be located in any premises approved by the Minister, including part of an existing Ontario Hospital. *Approved home* is a statutory term for homes in the community which are used for boarding-out convalescent patients.

### *Admission of Mentally Ill and Mentally Defective Patients*

Mentally ill patients may be admitted to an Ontario Hospital in any one of the following ways:

- (1) On a voluntary application by the patient himself. (Sections 19, 20.)
- (2) On the certificates of two medical practitioners accompanied by a history form and financial statement. (Sections 21, 22, 23.)
- (3) After a judicial inquiry by a magistrate on the warrant of the Deputy Minister of Hospitals. (Sections 26-31.)
- (4) Any person who is charged with any offence may be remanded by a magistrate or judge for 60 days' examination. (Section 36.)
- (5) Prisoners in reformatories, gaols, etc., may be transferred to an Ontario Hospital on the warrant of the Lieutenant-Governor. (Section 33.)

In addition to the five methods outlined above, a mentally ill person may be sent to an examination unit on the certificate of one medical practitioner

for a period not exceeding 30 days. During this stay of 30 days under observation his mental condition will be determined and, if necessary, the patient can then be certificated by two medical practitioners and detained in the same manner as patients under paragraph 2 above. (Section 61.)

Mentally defective patients are admitted in the same manner as mentally ill patients with the exception that a mentally defective person cannot make a voluntary application. There are, of course, separate forms for mentally defective patients containing the necessary changes in terminology.

#### *Provision for Epileptic Patients*

Epileptic patients may be admitted by any of the six methods outlined for mentally ill patients. The forms for epileptic patients contain the necessary changes in terminology. (Sections 58, 59.)

#### *Habituate Patients*

Habituate patients may be admitted in three ways:

- (1) On a voluntary application. (Section 47.)
- (2) The friends or family of the habituate person may present a petition to a judge in chambers of the county or district court in which the alleged habitue resides. The judge conducts an inquiry to determine whether or not the person is an alcoholic or drug addict, and, if he is so found, he can be committed to an Ontario Hospital for a period not exceeding two years. (Sections 48-52.)

- (3) An habitue may be admitted to an examination unit or to an Ontario Hospital on the certificates of two medical practitioners for a period not exceeding 30 days. If necessary, a petition according to the provisions of paragraph 2 above may be presented and heard during this 30 days' detention. (Sections 53, 54.)

#### *Mental Health Clinics*

The Act (Part IX) provides for the establishment of mental health clinics. The clinic is designed to be a travelling unit which will be of assistance to the medical profession and to the community. Their service will consist of advising in the diagnosis and treatment of mentally ill persons in the community and in carrying on the treatment of the less severe cases not requiring to be sent to hospital. It is also provided that the clinic may conduct examinations of pupils in schools on the request of the local school board and with the consent of the parents.

#### *Protection for Medical Practitioners*

Provision is made for some measure of protection against frivolous and vexatious legal action in section 11 (1) of the Act, as follows:

"No action, prosecution or other proceedings shall be brought or be instituted against any officer, clerk, servant, or employee of the Department, or the Public Trustee, or against any other person for any act done in pursuance or execution or intended execution of any duty or authority under this Act or the regulations, or in respect of any alleged neglect or default in the execution of any such duty or authority, without the consent of the Attorney-General."

**Fourth Annual Christmas Meeting**

**LABORATORY SECTION**

Royal York Hotel, Toronto

**MONDAY and TUESDAY**

**DECEMBER 30th and 31st, 1935**

# LABORATORY SECTION

## RAPID TYPING OF THE PNEUMOCOCCUS (The Neufeld Test)

M. H. BROWN, M.D., B.A.Sc. (MED.)

*Research and Clinical Associate in the Connaught Laboratories and Assistant Professor of Hygiene and Preventive Medicine, University of Toronto*

NEUFELD<sup>1</sup> demonstrated in 1902 that the addition of homologous serum to a culture of pneumococci causes a marked swelling of the capsules of these organisms. Recently this phenomenon has been restudied and utilized as the basis of a very rapid method of typing pneumococci as they occur in sputum. In using this rapid method it is essential that the sputum be fresh and that typing sera (rabbit) be employed undiluted.

For convenience in performing the Neufeld test, homologous sera for types I, II and III pneumococci are now available in capillary tubes containing sufficient serum for the testing of one specimen of sputum. The serum is expelled from the capillary tube by the use of a small rubber bulb furnished in each package. In addition a sufficient quantity of Loeffler's alkaline methylene blue is supplied for use in the test. Supplies of typing sera should be kept in a refrigerator and if so stored will be found satisfactory for a period of at least one year.

### *Collection of Sputum*

Sputum should be freshly obtained and collected in a clean sterile bottle. It is best examined within two hours but it is possible to carry out the test satisfactorily even after twenty-four hours if the sputum has been kept on ice.

### *Method of Typing*

Thoroughly cleanse an ordinary glass slide and divide it into three areas, using a glass-marking pencil. With a platinum loop deposit on each of three areas a small fleck of sputum collected without preservative not more than two hours previously. To

one fleck add two or three times its volume of undiluted rabbit typing serum (type I), then a drop of Loeffler's alkaline methylene blue, and mix well. Proceed similarly with the other two flecks, using type II serum and type III serum respectively and adding a drop of methylene blue to each as described above.

Over each of the three areas place a cover slip and press the latter down in order to ensure a thin uniform layer of stained sputum. Seal the edges of the slips with paraffin or white vaseline using a platinum loop heated in the flame. Examine the three areas of the slide under an oil-immersion lens, keeping the lighting of the microscope reduced in order that an excess of illumination will not tend to make outlines of capsules invisible. To this end use of blue light is helpful but not essential.

### *Interpretation*

A positive Neufeld reaction is denoted by a marked capsular swelling having a distinct outline and usually showing a ground-glass appearance (figure II), whereas in a negative reaction the capsule appears only as a small and indefinitely outlined halo (figure I).

If in one of the areas of the slide under observation a positive reaction is observed, the type of the organism is that of the typing serum used for the area. While the reactions usually develop almost immediately, they should not be considered as negative unless at the end of half an hour no change is noted in the capsule.

In the case of type III pneumococcus the micro-organisms may become packed together as a result of

capsular swelling so extensive as to be difficult to recognize. In such in-

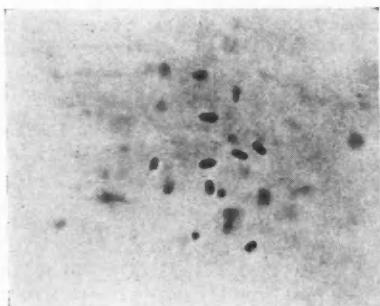


FIGURE I—A fresh culture of pneumococcus, type I, to which normal serum was added. The capsules surrounding the pneumococci show no evidence of swelling.

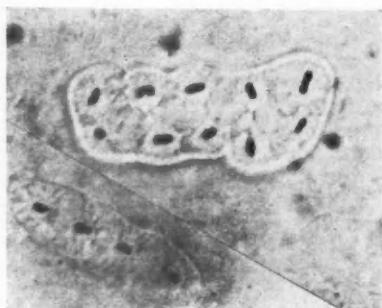


FIGURE II—Same culture as in figure I, to which homologous serum, type I, was added. Marked swelling of the capsules is shown.

stances the sputum should be diluted with saline to the end that a conclusive reading of the Neufeld reaction may be made.

#### *Preparation of Typing Serum*

Rabbit antiserum must be used, as immune horse serum will not elicit the reaction with the same degree of regularity and specificity. The serum may be prepared by injecting rabbits with heat-killed suspensions of the pneumococci of the representative types. In each instance a 24-hour broth culture is employed. The growth of organisms contained in 4 cc. of the broth culture may be given as the first dose. The culture is centri-

fuged and the sediment suspended in 1 cc. of saline. It is killed by heating at 56° C. for three-quarters of an hour. The rabbits are injected intravenously. Second and third injections of the growth from 4 cc. of broth are made on successive days, followed after an interval of four days by a similar series of three injections of the growth from 8 cc. of culture. Subsequent doses include the growth from 16 cc., 16 cc., 32 cc., 32 cc., 32 cc., 40 cc., 40 cc., 50 cc., 50 cc., 50 cc., 50 cc., 50 cc., and 50 cc. In each instance the sediment is suspended in one cc. of saline, being prepared the day before the injection is given. The virulence of the cultures should be maintained by frequent mouse passage.

At the end of this course of injections a blood sample is obtained and usually the titre is found to be from 1/80 to 1/160 as determined by macroscopic agglutination. If the titre is satisfactory the animal is bled out, from 100 to 120 cc. of blood being obtained, yielding 50 to 60 cc. of serum. The serum is filtered through a Berkefeld candle to ensure sterility and is stored in the ice-box at 5° C. It should be used undiluted in this test.

#### DISCUSSION

Previous methods of typing employing mouse passage and macroscopic agglutination tests were time-consuming. The stained slide method of Sabin<sup>2</sup>, introduced in 1929, was a definite advance. It consisted in injecting sputum into the peritoneal cavity of a mouse and withdrawing peritoneal fluid in three hours. Specific agglutination was demonstrated by mixing the peritoneal fluid with type sera on a glass slide and observing the stained preparation under the microscope. The Neufeld method is even more rapid, requiring from fifteen minutes to half an hour. The test requires the minimum of equipment.

During the past five years rapid methods of typing have been employed in the Connaught Laboratories

on specimens of sputum received. The Neufeld test has been in use since May, 1934. In table I the results obtained in typing sputum from 279 cases of acute pneumonia are presented.

TABLE I  
TYPE INCIDENCE OF PNEUMOCOCCUS FOUND IN SPUTA OF ACUTE PNEUMONIA IN  
TORONTO, CONNAUGHT LABORATORIES

Year	No. of Cases	Type I %	Type II %	Type III %	Group IV %
1930.....	56	23=41.1	11=19.6	6=10.7	16=28.6
1931.....	62	18=29.1	2=3.2	14=22.6	28=45.1
1932.....	69	11=15.9	5=7.3	10=14.5	43=62.3
1933.....	46	10=21.7	3=6.5	8=17.4	25=54.4
1934.....	46	19=41.3	3=6.5	8=17.4	16=34.8

The Neufeld method may be used to type pneumococci from spinal fluid and pus from the peritoneal cavity, pleural cavity and middle ear, as well as sputum. The technique is similar to that described above.

The exact nature of the phenomenon of the swelling of the capsule is not known but it is thought to be a precipitation reaction due to the union of the specific antiserum with the

homologous polysaccharide in the capsule. The typical reaction is not obtained when broth cultures are used. The reason is not apparent but it may be due to the abundance of the specific polysaccharide in the fluid

TABLE I

TYPE INCIDENCE OF PNEUMOCOCCUS FOUND IN SPUTA OF ACUTE PNEUMONIA IN  
TORONTO, CONNAUGHT LABORATORIES

culture which unites with the antiserum and thus absorbs the antibody, inhibiting the union of antiserum and capsular polysaccharide.

## REFERENCES

- (1) Neufeld, F.: Über die Agglutination der Pneumokokken und über die Theorieen der Agglutination, *Ztschr. f. Hyg. u. Infektionskr.*, 1902, 40: 54.
- (2) Sabin, A. B.: The "Stained Slide" Microscopic Agglutination Test, *Proc. Soc. Exper. Biol. & Med.*, 1929, 26: 492.

## CONNAUGHT LABORATORIES WESTERN DIVISION

**I**N consequence of an arrangement which has been entered into by the Provincial Board of Health of British Columbia, the University of British Columbia, and the University of Toronto, there has been established in the University of British Columbia as of October 1st, 1935, a Western Division of Connaught Laboratories, University of Toronto. The undertaking, in the first instance, is for a period of one year.

Primarily established as a research centre, it is hoped that the co-ordination of activities of the Department of Bacteriology and Preventive Medicine of the University of British Columbia with those of the Provincial Board of Health Laboratories of British Columbia and of Connaught Laboratories, will make it possible to extend considerably the fields of usefulness of all three institutions.

Dr. C. E. Dolman has been appointed Associate Professor and Acting

Head of the Department of Bacteriology and Preventive Medicine, and Acting Head of the Department of Nursing and Health in the University of British Columbia. He has also been appointed Director of the Provincial Board of Health Laboratories of British Columbia. He will, furthermore, continue as a member of the staff of Connaught Laboratories as a Research Member. Dr. R. J. Gibbons of the staff of Connaught Laboratories will be associated with Dr. Dolman, seconded for duty in the Western Division. At the outset Connaught Laboratories Western Division will be provided with quarters in the Science Building of the University of British Columbia.

This novel experiment in Inter-University and Provincial Health Department collaboration should afford excellent opportunities for expansion of activities in the field of preventive medicine in Western Canada, especially in British Columbia.

## BOOKS AND REPORTS

**The Care of the Aged, the Dying, and the Dead.** By Alfred Worcester, M.D., Sc.D., Henry K. Oliver Professor of Hygiene, Harvard University. Published by Charles C. Thomas, 220 East Monroe Street, Springfield, Illinois, 1935. 77 pages. Price \$1.00.

In our modern medical training the art of medicine is frequently lost in the science of medicine. In this little book Dr. Worcester emphasizes the fact that the physician's most fruitful chance of helping the aged lies in the *art* of medicine alone, in lightening the burden of their woes, infusing new hope and inducing peace of mind. The chapter on the care of the dying is a rare gem of advice which is of great value to the physician and to the nurse. The section devoted to the care of the dead is one which every undertaker as well as physician should read.

This little volume will well repay every one who reads it. It will be an encouragement and a help especially to the young practitioner who will find that his aged patients will profit a great deal from his tact, courtesy, sympathy and devotion alone.

K.F.B.

**Annual Report of the Health Department of the City of Winnipeg for the Year Ending December 31, 1934.** A. J. Douglas, M.D., Medical Officer of Health. 84 pages, with tables.

The Health Department of the City of Winnipeg is to be congratulated upon the early appearance of its annual report for the calendar year 1934. The report is presented in eleven sections, the first of which is the statement of the medical officer of health. The various divisional reports all contain data which are of great interest to an interested reader.

The report is full of absorbingly interesting facts. The strikingly low death rate of 6.7 and birth rate of 13.3 are manifestations of the favourable constitution of the Winnipeg population and of modern social and health trends. The statistics on infant mortality show that 52 per cent of all infant deaths occurred during the first week of life and 63 per cent of them during the first month. This fact, together with the low infant mortality rate of 46 per 100 live births, indicates forcefully that if improvement is to be continued in this field the point for attack in the child hygiene program becomes the first month of life, the mortality during this period having declined but little in the last twenty years.

The logical arrangement of the material, to which there is an index, is fine. The table giving case reports and deaths from

various communicable diseases shows that the case fatality for diphtheria was only 2.9. In this connection reference might be made to the inclusion in the table of case fatality rates for certain diseases where only one or two deaths were recorded. Such rates may be misleading.

If one might offer any suggestion, a more extended statement by Dr. Douglas concerning not only the work accomplished during the year but also the need of the department, of its opportunity and of its present problems, would constitute a challenge to his city which would be supported by every statement in his published report. Few medical officers of health in Canada could so satisfactorily express this challenge as can Dr. Douglas who, from years rich in experience in successful health administration, knows intimately the whole problem.

A.H.S.

**Twelve Hours of Hygiene.** By F. L. Meredith, B.Sc., M.D. Published by P. Blakiston's Son and Co. Inc., Philadelphia, 1935. 387 pages. Price \$1.90.

In "Twelve Hours of Hygiene" the author presents an abridged edition of his book, "Hygiene, a Text Book for College Students". There is no doubt that it would take more than twelve hours for an ordinary reader to assimilate the contents of this volume but the text is well written and the variety of subject matter dealt with places it among the best books dealing with personal hygiene that the reviewer has read. The index is a valuable asset.

The opening chapter of the volume deals clearly and in satisfactory detail with the various body functions. Other chapters deal with nutrition and energy requirements, communicable diseases, accidents, infection and immunity. The section dealing with reproduction and sex is particularly well done in view of the purposes for which the book was written. The question and answer style, which is used latterly, is well suited to a discussion of this particular subject.

On the whole, the field of personal hygiene is dealt with briefly but with satisfying detail and the average college student will readily be able to grasp the facts. An appendix gives tables showing the energy food values of various foods, certain diets, age and height-weight tables, etc. This feature greatly increases the potential value of the text.

"Twelve Hours of Hygiene" may be highly recommended to any lay person desiring to become acquainted with the essential facts of personal hygiene. The book is admirably suited for use in any course on hygiene for non-medical students.

D. L. M.

